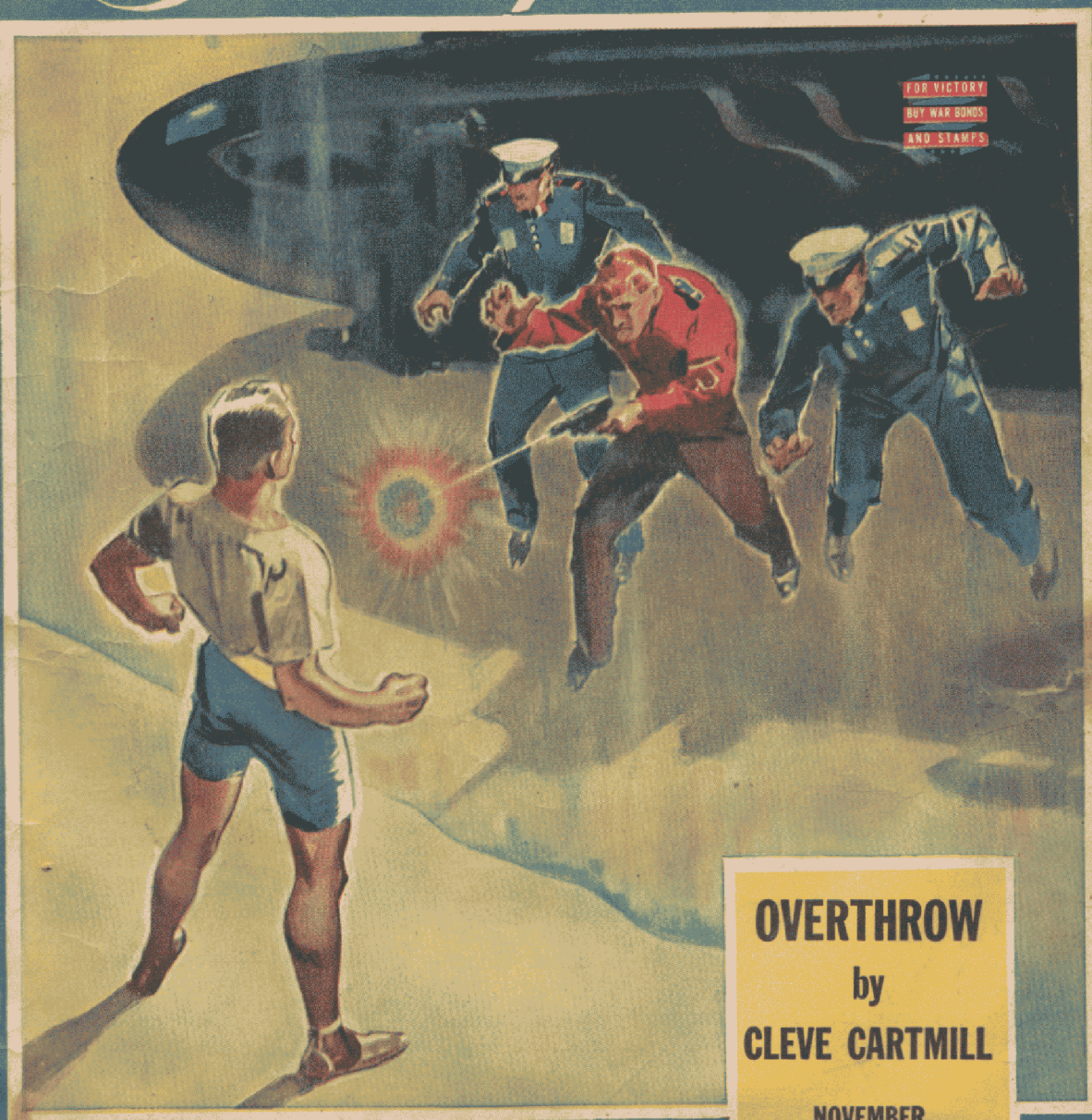


# ASTOUNDING

NOV. '42

*Science Fiction 25c*



**OVERTHROW**  
by  
**CLEVE CARTMILL**

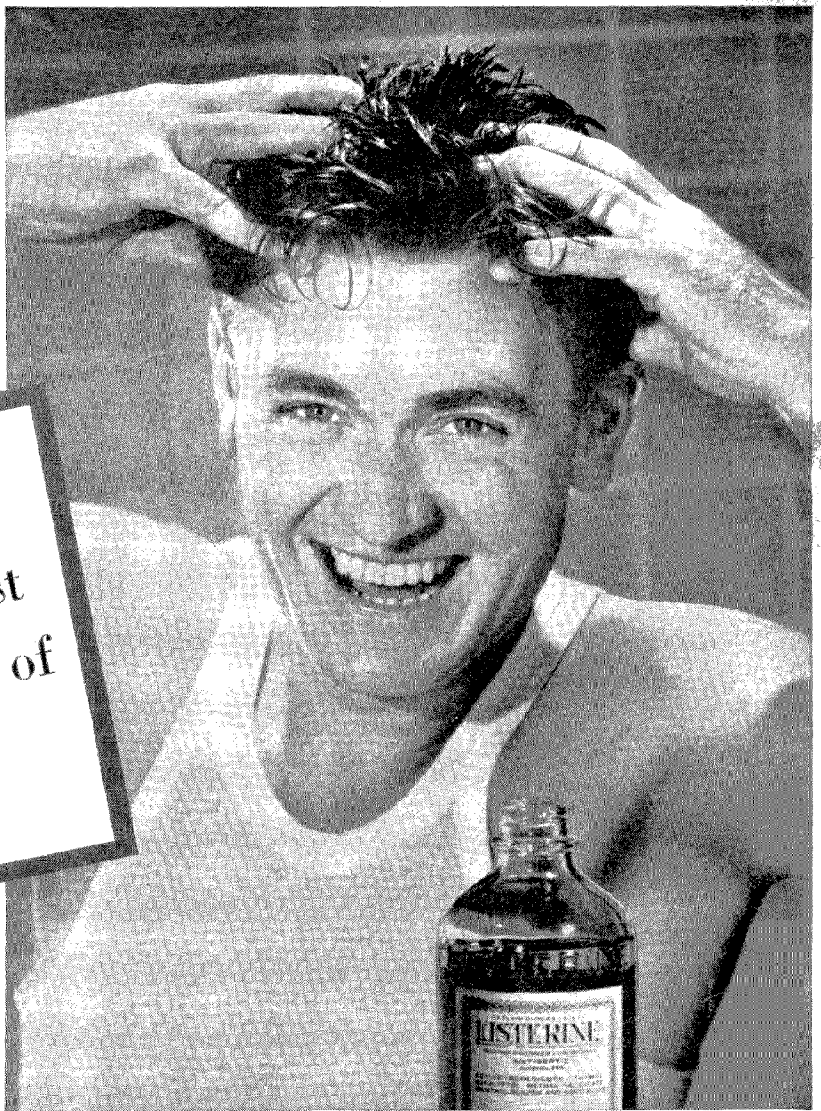
NOVEMBER  
1942

A STREET AND SMITH PUBLICATION



# Washing your hair?

**LISTERINE**  
to guard against  
infectious type of  
**DANDRUFF**



**H**ERE'S a tip from the lips of thousands of men who have been helped by the Listerine treatment:

As a part of every shampoo, either preceding or following it, as you prefer, use full strength Listerine Antiseptic, followed by vigorous and persistent massage.

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SAFEGUARD  
I KNOW*



## *The TREATMENT*

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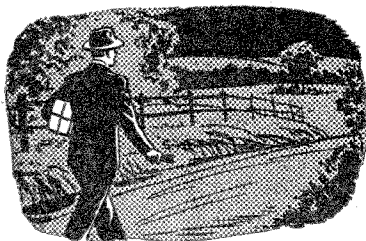
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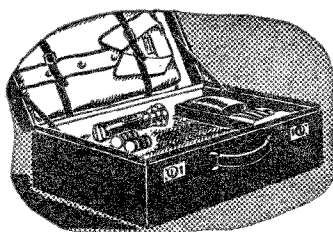


# How to make your FLASHLIGHTS and BATTERIES LAST LONGER

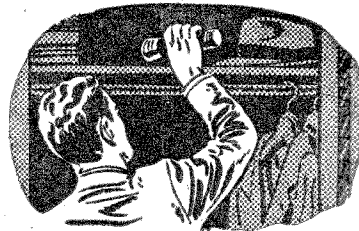
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and the Office of Civilian Defense



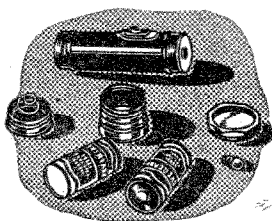
**① DON'T USE FLASHLIGHT CONTINUOUSLY.** Snap it on when you *need* to see—then snap it off. *Needless* use of flashlight merely wastes "juice."



**② WHEN STARTING A TRIP,** don't toss your flashlight *loaded* into your suitcase, haversack or toolbox. Unscrew, or remove batteries—then switch can't "catch" and waste batteries.



**③ KEEP FLASHLIGHT OUT OF CHILDREN'S REACH.** It is not a toy—but a tool for your convenience and safety. *Know* where it is at all times—so you can put your hand on it quickly when you *need* it.



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# EVEREADY

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## FLASHLIGHTS AND BATTERIES





# ASTOUNDING

## SCIENCE-FICTION

TITLE REGISTERED U. S. PATENT OFFICE

Contents for November, 1942, Vol. XXX, No. 3

John W. Campbell, Jr., Editor, Catherine Tarrant, Asst. Editor

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He set out to prove he was no rebellious traitor, to regain his position. And, somehow—things went astray. He did exactly what he meant to prove he wouldn't do—

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Cover by Modest Stein

Illustrations by Fax, Kolliker and Kramer

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# SNEAK INVASION

Science-fiction readers and writers are convinced of the unimaginative nature of mankind in general, the total lack of understanding of Johnny Q. Public with respect to the fact that change does and inevitably must come. But here-with I suggest that even the science-fictionists aren't too ready to accept the idea—except in an intellectual sort of fashion, impersonally, as one accepts—without really believing—the idea that he must, himself, die.

I don't—can't—know what your age is, but you can fill in the ages for yourself. Let's talk about a man who's thirty now, born in 1912, or very early 1913. In 1952, he'll be forty, and about set in the line of work he'll be doing during his peak productive years from forty to fifty—1952 to 1962. Depending on his particular company, and his type of work, he may retire in 1972 at sixty, in 1977 at sixty-five, or go on to 1982. If he's a technical man, a laboratory worker perhaps now, he may be a research executive in 1962. Maybe it's simply that high intelligence means higher income and hence better diet, or maybe it's a linked hereditary factor, but supernormal intelligence seems to be accompanied by abnormal vitality and longer life. Our man's very apt to live to 1993, or at least to 1988.

What degree of the progress we talk about is apt to come by that time?

The new techniques filter into normal life so smoothly, in such small steps, with so much fore-warning, that they never surprise us. No company manufactures new devices until they've prepared the public to receive and use them. If the complete and perfected mechanism for antigravity were discovered next year, for months before the thing were announced as possible, the papers and magazines would be filled with arguments as to whether this new and wonderful theory would lead to it. They would be filled with arguments and discussions until the public was very thoroughly bored with the whole silly business, and everybody but the experts could see plainly that it was just a matter of a few more months of work before they had it. Then the announcement would simply tell people what they'd been expecting all along, anyway.

The incredible invasion of antigravity into our normal lives would have sneaked across without doing anything more exciting than boring the populace with forerumors. And there'd be nothing new about it at all—no real change in normal ways. Just a little improvement that anybody with sense would have seen was needed long ago. The combination automobile-airplane that didn't need an airport to land. "No really fundamental

change." Of course, some tendency to live farther out, and commute to work from distances up to two hundred and fifty miles. And a tendency for factories to move away from cities, since antigrav trucking made rail and water-port facilities less important. And since many workmen had taken to living in floater homes that they could carry from place to place like a sort of supertrailer that floated on air, the labor markets wouldn't be concentrated in cities any more.

But no really important, surprising changes, you understand—just minor improvements that everyone expected, if they had any common sense at all. Just minor changes—that wiped out the cities of the Earth, destroyed every railroad, shipping line, and annihilated the value of land that the nearness of great cities had once conferred on suburban real estate.

You'll never see atomic power come in—unless you watch sharp, and don't let it slip in unawares, it will simply *be* in. Synthetic atomic products—man-made atoms—are already applied in several commercial or technical applications. That's been sneaked in with so much boring fanfare that people don't notice anything worthy of note in it.

The speed of introduction is going to be startling—when you think about it, looking back, in 1982. They'll all sneak by on the way in. Synthetic atomic products in wide technical use by 1947. Some synthetic atomic products in general home and office use by 1952, particularly as a source of a type of atomic power, where low wattage by extremely high voltage is wanted. Atomic power for stationary, large plants will be in use by 1955, for aircraft by 1957, and for home heating probably about the same time.

Probably the earliest experimental voyages into space will have taken place by 1955. By 1957 they will have reached the boring stage. By 1960, when lunar landings are finally put on a regular supply basis for the observatories there—

"But no really important, surprising changes, you understand." No, as any fool can plainly see, all they did was make stratosphere planes a little better, and then when the jet-type planes began going up a little higher, and the convertible-drive type jet-to-rocket types went a little higher, they stopped sampling the stratosphere and started making studies of the vacuum just beyond the stratosphere. Not interplanetary space, you understand—just the roof beyond the atmosphere. They'll edge out so smoothly that you'll never be able to point to any one type of ship and say, "This was the first spaceship." Because any of half a dozen that will precede it could have done the same—

The Editor.



# HOW A **FREE LESSON** STARTED BILL ON THE WAY TO A **GOOD RADIO JOB**

I'LL ALWAYS BE A FAILURE IF I STICK TO MY PRESENT JOB

BUCK UP, BILL, WHY NOT TRY AN INDUSTRY THAT'S GROWING -- WHERE THERE'S MORE OPPORTUNITY

MARY'S RIGHT -- I'M NOT GETTING ANYWHERE. I OUGHT TO TRY A NEW FIELD TO MAKE MORE MONEY

LOOK AT THIS -- RADIO IS CERTAINLY GROWING FAST -- AND THE NATIONAL RADIO INSTITUTE SAYS THEY TRAIN MEN FOR RADIO RIGHT AT HOME IN SPARE TIME

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YOU SURELY KNOW RADIO. MINE NEVER SOUNDED BETTER

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**J. E. SMITH, President, Dept. 2KD, National Radio Institute, Washington, D. C. TRAINING MEN FOR VITAL RADIO JOBS**

OH BILL, I'M SO GLAD YOU SENT FOR THAT **FREE LESSON** AND **PROVED TO YOURSELF** THAT YOU COULD LEARN RADIO AT HOME

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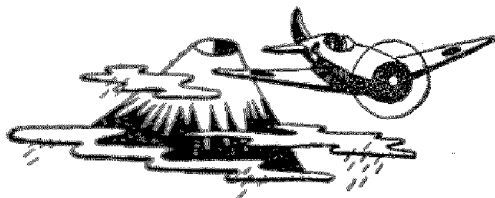
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# OVERTHROW

By Cleve Cartmill

● His idea was to prove he'd been falsely accused, to prove he was an honest, sincere upholder of the government. Somewhere, things got confused—and he did what he set out to prove he wasn't doing!

## I.

Chief of Police Josh Cameron focused the blur on his screen.

"Outlaws!" he muttered. "How in the bloody—" He touched a button labeled "pilot." It glowed instantly and he said, "Go up!"

"We're at thirty thousand now," the pilot's voice complained. "This is no stratoliner."

"Ask the captain to come here, please."

"Yes, sir."

Cameron watched the slim image grow in size until Captain Jorgeson squeezed through the narrow entrance of the guard cubicle. Cameron

"Will you be so good, sir? We're in a jam, I'm afraid. Look!"

Captain Jorgeson fixed the screen with a bright-blue glance. His great hands knotted. His face flamed red as his hair.

"I'll be a son of an actor!" he grated. "It leaked out again!" He glared at Cameron. "Well? You came along especially to prevent this. Nobody knew about it but you, me, and the pilot. What have you to say for yourself?"

A slow flush seeped up Cameron's dark throat and overspread his tan. His black eyes went coldly blank.

"On this plane," he said with slow emphasis, "you are the law. May I remind you that our

positions will be reversed when we return to Plastic Prime?"

"If we return, sir!" the captain flared. "Don't pull official dignity on me, Cameron. I'm trying to get the truth. Did you open your mouth to anyone about this mission?"

"Of course not! Am I a fool?"

"We'll see. Well, you're the guard. Get us through."

"With not even a point-blank disintegrator? You expect a great deal, captain."

"You'd better deliver," Captain Jorgeson said grimly.

When the big red-haired man had gone, Cameron turned gloomy dark eyes on the screen. The rakish silhouette grew so swiftly that he caught his breath. What speed! The forces of law and order were far behind the outlaws in this respect, and Cameron found himself wondering again why they did not attack one or more of the Centers.

Yet they never tried, and this made him vaguely uneasy whenever he thought of the outlaws. They made their own rules, or lived by none. They raided freight planes, they rarely came off second best in brushes with the military, and they had sources of information which were frightening.

This shipment, for example, had been Plastic Center's most highly guarded secret. No more than a half dozen officials had known about it. It was inconceivable that any of them had rattled. Somebody had, unless this encounter were pure accident; and the purpose clearly apparent in the outlaw's direct approach threw cold water on that flicker of hope.

It was dashed with cold finality when a precise voice came through Cameron's monitor:

"Down, or I'll cut you in two. At once, please."

No questions. Just a command. The speaker didn't want to know where *Fleetfin* was headed, who was aboard, or what time it was.

"Who are you?" Captain Jorgeson blustered.

Cameron watched the grille of his monitor as if he could conjure the voices into faces and legs.

"I don't want to kill you," the frosty voice replied, "but I'm not in the least sentimental. I shall give you thirty minutes to land at Dead Horse Spring, two points to port. You'll have to—"

*Fleetfin* shuddered slightly, and Cameron cursed the captain's stubborn idiocy. He touched another button on his panel.

"Down, damn you!" he ordered. "We'll settle the question of authority later. I order you down. You can't fight that ship. Cease firing!"

The outlaw's voice broke in, crisp with annoyance. "You can see that I'm shielded. One more blast from you and you begin second-guessing in hell."

Captain Jorgeson, a red-topped mountain of wrath in the cubicle doorway, roared at Cameron.

"Who's giving orders here? The council will—"

"Oh, dry up!" Cameron said. "I told you we'll fight it out later. I don't want to be on a killed-in-action list. There's nothing you can do, anyway, but go down. He's shielded. Why make him sore by shooting at him?"

"You're under arrest!" Jorgeson snarled.

Cameron bowed sardonically at the departing footsteps and sat back to await the landing.

Clouds which might have come straight out of Textile Center seemed to drift upward, and presently Dead Horse Spring was visible in miniature far below. It rose steadily toward them, as did the pocked desert. They were soon on its face and the long black ship drifted gently toward them.

"All outside," came the outlaw's voice.

Cameron joined the captain and the young, bright-eyed pilot as they stepped out into the pungent heat. The odor of sage was hot in their nostrils and they shielded their eyes from sand glare as the outlaw craft settled fifty yards away.

Cameron noted a phenomenon, then. Some twenty feet before him, the surface of the desert was marked by a line no more than an inch in width. It was no mark such as paint would make, it was not a line of vegetation, it was a line drawn by—nothing. The sand itself writhed within this narrow space, and the boiling demarcation stretched off to either side as far as the eye could see. It was as if a million tiny animals burrowed from underneath in geometric formation.

He flicked a dark glance at his companions, but their gaze was fixed on the figure who emerged from the long plane.

This was a man, like other men, dressed in the garb of an ordinary citizen. His shorts, sandals, and shirt would have passed without notice in any crowd. But not his bearing, not his face.

Whereas the ordinary citizen went stolidly about his directed business, this man walked like an official, or a commander. Whereas the eyes of an ordinary citizen were usually blank and withdrawn, this man's sparked. He was dark and hawklike, and completely at ease as he approached, despite the fact that he was unarmed.

His wide thin mouth curled up at one corner as he examined the trio. "I am happy," he began in courteous phrases of the day, "to see you. May I be of service?"

"Your offer," the captain replied automatically, "is most kind, and reciprocated." Having disposed of the amenities, Captain Jorgeson roared, "What the—"

The outlaw lifted a dark hand. "In good time, captain. Please notice the agitation here in the sand." He pointed to the narrow, writhing line which Cameron had already seen. "That marks the location of my defensive weapon. You see



that I am unarmed. I warn you not to attack, for if you touch this screen you will simply—vanish. I am quite serious,” he added, as Captain Jorgeson began to grin. “Don’t—”

He broke off as Jorgeson whipped a Payne coagulator from its holster and depressed the activator. He waited, calmly, until the captain, with a baffled expression, lowered his weapon.

“Don’t touch it,” he continued.

“It’s a bluff!” Jorgeson said quietly to Cameron and the pilot. “There isn’t any such weapon. Let’s get him.”

The big redhead led the charge in a plunging rush and the young pilot was on his heels. Cameron stood motionless. He decided that if the outlaw really had such a weapon, attack was useless. If not, let the others prove it.

Jorgeson reached the area—and exploded. It was just that, Cameron thought. It sounded like an old-style bomb—a muffled boom, a brilliant flash, and silence. The silence was infinitesimal, for the young pilot could not check his momentum.

He tried. He dug his heels into the sand. He screamed once, just before he slid into the writhing line. Then he exploded.

Cameron staggered from the second concussion, and in the ensuing silence tensed himself against falling debris. What goes up comes down. But nothing came, not even a button from Jorgeson’s uniform.

There was utter silence except for the whisper of wind in dry, thin vegetation. The two dark men looked at each other.

In the stranger’s eyes was dark sorrow, and his mouth was serious. In Cameron’s heart was a touch of awe. Such things were impossible.

The stranger spoke first. “I haven’t decided whether you’re intelligent, soldier, or whether your reflexes are slow. Do you know?”

“What is it you want?” Cameron asked.

“Your cargo, of course. All seventeen crates of Baltex.”

Cameron caught his breath. “How—”

“How do I know? That, my friend, would be telling. I do know, and that is the important fact. Will you stack the crates outside your ship? Then you may go. I’m sorry about the other two. They really suicided, though.”

Cameron weighed the factors. He couldn’t get through that diabolical screen, whatever it was. He couldn’t escape, not in this tramp freighter. He shrugged.

“I guess you have me.”

“You are intelligent!” the stranger exclaimed.

“Then why in the name of Heaven are you still in a Center? Why aren’t you with us?”

Cameron sneered. “With outlaws?”

The stranger’s face lost animation. It became just a face. “Get at it, then!” he snapped.

Cameron lugged the crates one at a time out of the freight compartment and stacked them on the sand. After a half-hour of this, his uniform was splotted with sweat, his whole body wringing wet. He set the final crate atop the pile and faced the stranger.

“Now what?”

“Oh, on your way, soldier. Take back this message. If so much as one more woman is taken from outside any Center, the whole will suffer. Tell your superiors about this screen of contra-terrene energy. It’s impregnable. Maybe you can scare ’em, for their own good.”

“They don’t scare easy.”

“They can die easily then.”

Cameron looked at the dark stranger for some time, fixing each feature in his memory. He decided that there was little danger of forgetting him, for the man’s features were like Cameron’s own—wide, dark eyes, black hair, prominent nose, wide mouth, and a slim, wiry body.

“I’ll see you some day,” Cameron promised.

The dark stranger said nothing and Cameron presently shifted his eyes. He entered *Fleetfin* and took off.

When he was at cloud level he saw the stranger enter the long black craft. It maneuvered near the cargo, remained quietly until lost from sight.

“Somebody,” Cameron said aloud, “will pay for this.”

Every man on his force should be assigned to tracing the leak in some department along the production line. No, he reflected, the leak must be near the top, for the outlaw knew the nature and amount of cargo. He had intersected *Fleetfin*’s course as unerringly as if he had written the sealed orders.

Tracing the leak was a one-man job and he should be the man. The big shots in Power Center would scream their silly heads off at the loss of their purchased cargo, and would try, perhaps, to toss Cameron to the council. But if he could produce a spy he should save himself and protect further secret cargo.

Another point in his report, he decided, would also create havoc. Women. He smiled grimly as his mind’s ear picked up the anguished protests of entertainment tycoons. Without the vivacious, beautiful outlaw hostesses, the entertainment profits’ curve was headed for a nose dive. They must agree to the outlaw’s ultimatum, Cameron thought, for that screen was a definite menace.

He thought of the noise a man makes when he explodes, and shuddered. They’d have to stop their piracy, whether they liked it or not. No more raiding parties at night, no more spotting an outlaw camp, no more stalking a particular beauty along the path to a spring or river.

Cameron sighed. He’d had a lot of fun in the

palaces of joy. It would be hard shrift to do without those colorful nights.

A warning signal on his klystron brought him back to the job of piloting. Plastic Center's shield was, according to meter reading, a thousand yards ahead. He searched through the pilot's papers for the collapse combination.

He found it and depressed eight numbered keys on the panel. He held these down and accelerated. When he had gone five thousand yards he released the keys. He was now well inside Plastic Center, and the earth below was a riot of irrigated green.

Far ahead were the pastel domes of Plastic 3.9, the outlying subsidiary of Plastic Prime. He passed over this and others at full speed, and was at the main landing port in an hour.

At ten o'clock on the following morning, Cameron left his apartment for the council chambers. He was thoughtful as a taxi whisked him over gleaming rooftops. He wasted no glance on the maelstrom of movement below, ordinarily a picture of æsthetic pleasure. He took no notice of the patterned movement of aircraft.

For he had been summoned to appear before the council.

Summoned.

So many others, he knew, had been summoned in this manner, and had been reduced to the status of ordinary citizen, doomed to perform the routine tasks of production—to run the machines that manufactured the products that other Centers wanted in trade for products that Plastic needed to augment its own. Ordinary citizen.

Then he shrugged. This must be an exceptional case. They wanted a report, perhaps. Or they wanted his testimony so that a criticism could be lodged against the guilty party—the leak.

He paid the taxi pilot, walked from the landing roof to a moving ramp and rode it to a lower level. He went down a deserted corridor—deserted because nobody came here unless ordered—to the council-chamber door. He stood on the identification plate until the door slid upward. He entered the chamber.

The council members looked at him gravely, their gravity accentuated by their formal robes of Democracy. Cameron took the witness chair and faced them.

"Gentlemen, I am happy to see you. May I serve you?"

"Your offer," the bearded chairman intoned formally, "is most kind, and reciprocated." His manner changed. "What have you to say for yourself?"

Cameron blinked. "Say? For myself? What do you mean?"

A snicker circled the council table. Young and old, these elected members seemed to be amused

at Cameron's question. Their amusement had a sinister overtone.

"We have evidence," the chairman explained, "which points to you as the person who gave information to the outlaws and co-operated with them in confiscating vital materials. Secondly, you are indicated as the person who killed two useful citizens of Plastic Prime."

Cameron's jaw dropped. "But my report—"

"Has been examined, and the scene investigated. What did you do with the bodies?"

"They—exploded. I described it."

"Josh Cameron," the chairman said earnestly, "I must warn you that you are in a precarious position. The fantastic tale you spun only does you harm. We want the truth before we reach a decision." He held a thin hand palm outward. "Not that we shall not lodge a criticism. That has been decided. But the exact type of criticism will be determined by your defense."

"But you have the truth!" Cameron protested. "I wrote it out in detail."

Their laughter was hearty, but not gay. It cackled at him, sharply.

"Captain Jorgeson's last notation on his log," the chairman said, "was 'Cameron ordered me down.' That shows you were in collusion with the outlaws. What did you do with the bodies? If Captain Jorgeson and the pilot were taken captive, tell us. That would be believable, and would affect our criticism."

Cameron's jaw set. "I'm the chief of police. I have the interests of this Center at heart. Look at my record. Would I invent some tale? Have you any previous indication of disloyalty? You have not. I'm telling the truth."

"It is our opinion that you are lying."

"But why? Why? What could I gain?"

"That is what you will tell us."

"Listen," Cameron said. "On my honor I'm telling the truth. If I had been in collusion with the outlaws I wouldn't have come back. I'd have known you wouldn't believe me. But now you must. The whole thing happened as I said in my report. They have that weapon. You must believe me."

"As you describe the outlaw," the chairman said, "he appears to be a man of education and intelligence. Now, we know what the outlaws are. You can't expect us to accept the idealized portrait you drew."

"How about the women we've stolen?" Cameron demanded. "Are they brutish, moronic, giantesses? Do they look as if they eat their young?"

"We have no personal data on these women," the chairman said with dignity. "We do not habituate places in which they are said to be employed."

"You should!" Cameron snapped. He stamped



out. At the door, he turned. He didn't say anything. He glared contemptuously for a moment before he went away.

## II.

Josh Cameron, ordinary citizen.

He was still Chief Cameron when he answered the summons at his apartment door, but when the heavy features of Captain Robert Fane filled the identity screen, he knew. He didn't see the accompanying soldiers, but he knew.

He twisted his mouth in bitter realization and touched the door control. Fane and his detail stepped inside, hands on their Payne coagulators.

"I am happy to see you," Cameron said. "May I be of service?"

Captain Fane rushed the formal answer. "You offer is kind and reciprocated." His blocky face set. "Where are the uniforms, guns, and other properties of Plastic Center?" He threw a bundle at Cameron's feet. "There are your new clothes. I want what you are wearing."

Cameron touched a button in the master panel and the walls slid up from his clothes closet and arsenal. "All right," he said. "Have at it."

Fane purpled, jerked out his side arm. He leveled it at Cameron, who flinched in astonished alarm, then lowered it. His heavy face did not relax, but his words had a touch of informality.

"The next time you do not pay proper respect to your betters you will probably die."

Cameron bowed his head. It was hard, for he had not known this status before. He had been typed as an official at birth and had received homage all his life. He knew how to behave as an ordinary citizen, but the knowledge was intellectual, not instinctive. With effort, then, he bowed as befitted him.

"You are kind," he said. "My conduct was inexcusable, but I crave leniency. My new station is unfamiliar as yet."

"You won't get a second chance," Fane snapped. "Enough of this chatter—off with your clothes!"

While the soldiers gathered up his emblems of office and social rating, Cameron shucked out of his fine, soft garments of blue Nodyn and into Textile Center's standard product. When he was dressed, he waited.

He waited without resentment, eyes downcast. Without question, without objection as the soldiers cleared his wall tables. A pang of regret tore at him when they bundled his precious reading tapes and tossed them on the heap. But he said nothing.

Humility clothed him, all right, but a plan formed slowly in his head. He knew that a few days' grace were his while the military court decided on the niche he should fill in industry. The court had acted immediately on the criticism of the council—that was automatic. But judicial

machinery ground slowly, and freedom of action—within established limits—would be his while they checked his aptitude and intelligence ratings and co-ordinated these with labor-type needs.

If he could run the spy to earth, the person who had notified the outlaws of that precious shipment of Baltex, and hale him before the council—he might be Chief Josh Cameron again.

So he bowed his head and listened with one ear to anticipated instructions. "You will be notified, Cameron, as to your job. In the meantime you know the restrictions on persons in your position. You will not attempt to leave Plastic Prime. You will not spend any money. You will not engage in any remunerative activity. The penalty, as you well know, is death."

Cameron did not raise his eyes when they left. He maintained his attitude of respect even after they had long since gone, but his brows furrowed in concentration.

He itemized in his mind the persons who might have known of *Fleetfin's* schedule and cargo. They amounted to a bare half dozen, and among them, he was convinced, was the traitor.

He could start his investigation at the top with Martin Grueter, or at the bottom with Loren Bradley. It would not occur to Captain Robert Fane that he would break parole. A clerk might, if reduced to ordinary citizen; a taxi driver might. But not an official who knew too well the ruthless aftermath of disobedience. This, Cameron thought, would be Fane's attitude. It would have been his own.

More than likely, then, he wouldn't be watched. He certainly wouldn't be reported by those on whom he proposed to call. They would automatically assume that he had permission.

He grinned faintly and punched a taxi summons. Then he went up on the roof and waited by the landing area until a small plane slipped out of the lower traffic lane.

"Hump yourself!" the driver snapped. "I ain't got all day."

Cameron whipped a hand to his hip, but grinned wryly as he touched rough brown cloth instead of the hard plastic of a coagulator.

"Sorry," he said, and jumped in before the driver could change his mind and dart away. "Take me to Factory 6," he ordered.

The driver did a slow burn. He turned, with sinister deliberation, a face twisted by controlled fury. "Take me to Factory 6!" he mimicked savagely. "And does your excellency want me to wait? Just who do you think you are, scum? You deadheads gimme a oscillatin' ache. Sign this!"

He shoved a record pad at Cameron. Cameron scrawled a signature with the stylus. "You get

paid for carrying me. Why all the screams?"

"It's your airs I don't like, scum. You'd think you was—" The driver broke off, screwed his face into an expression of half recognition. "Say. I've seen you before. You—" His expression altered to one of glee, with teeth. "Well, well! If it ain't the chief! Yessir, and will the boys love this! My, my! Demoted an' everything. A lot of people are going to dance tonight."

Cameron's dark face froze. He expected to be flicked on the raw to a certain extent, but there were limits. He said coldly, "I'll remember that when I get my uniform back."

The driver, in his turn, froze. Such a feat as Cameron predicted was rare, but not unknown. As everybody knew, a number of flap-mouthed taunters of similar unfortunates had been forced to eat their words—and found them fatally indigestible.

Yet it was not fear alone that flickered behind the hard surface of his eyes. There was surliness and smoldering hatred. Cops shoved you around. Cops told you when to go home. Cops commandeered your taxi if they felt like it. They were worse than soldiers, being underlings of the military.

The driver turned away, touched the drive, bank, and left keys on his panel and slipped into the local traffic flow. He cut out of the stream over Factory 6, drifted into the gleaming landing area and watched without comment as Cameron took a descending ramp into the squat building.

As Cameron had thought, he attracted no notice. Others in civilian-brown, clerk-gray, police-blue, military-red, and executive-purple looked through him as they went about their appointed tasks. They didn't see him.

He stood on the identification plate of Martin Grueter's office until the hearty voice boomed: "Son of an artist, look who's here!" and the door slid up.

Grueter was in the middle of a conference with underlings in gray and purple, but Cameron's entrance disrupted the business at hand. All faces turned smiling toward the door.

The smiles, one after another, became fixed, then faded.

"I am happy to—" the white-headed Grueter began. He broke off as he noted Cameron's costume. His kind mouth set, his eyes steadied, hardened.

"Get out of here," he said quietly.

Cameron's eyes touched on each member of the group and found no friendliness. Not even in Ann Willis, whom he knew well.

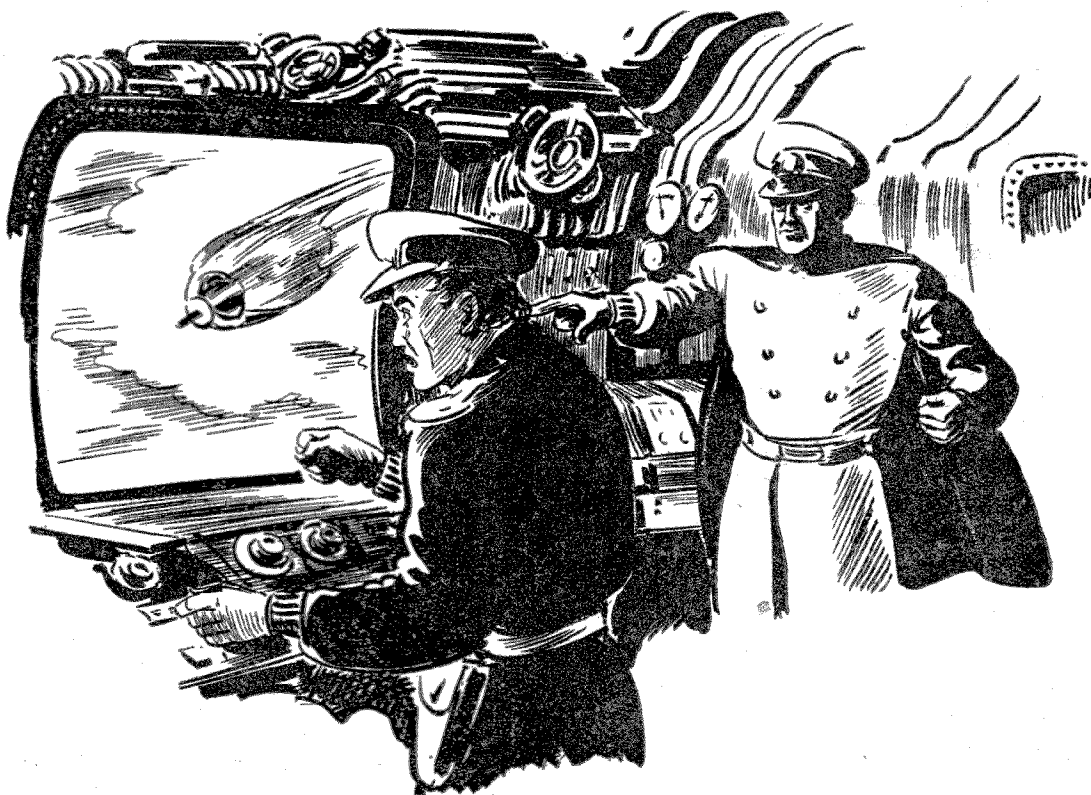
Her eyes, the same purple as her brief tunic, were as hard as Grueter's, who repeated, still quietly:

"Get out of here."

"Listen to me, Martin," Cameron said quickly. "I've been discharged on false evidence. You can help. I've got to—"

"Get out of here."

"Somebody tipped off the—"



"Get—OUT!"

The eyes had changed, subtly. Cameron understood. They had tolerated his entrance because of past relations. From their viewpoint the amenities had been observed. Any further intrusion from him and one of them would kill him.

He bowed his head. "I crave leniency. An error."

He backed out into the corridor and the door slid shut.

He stood thoughtful while the stream of workers and officials flowed around him, trying to decide on his next move. He felt no blame for Grueter or Ann. With others present they dared not show him more courtesy than they would any other citizen. The social gap must be maintained.

But if he caught one of them alone—

He walked down a short corridor, around a right-angled turn, to Ann Willis' office. He could wait, unobserved.

He stood at the window, as if watching the movement of planes on the loading field below was his assignment. Among these was *Fleetfin*, into which brown-clad men and women lugged small square crates. Cameron wondered if this was another shipment of Baltex; wondered, too, what Baltex might be and why it was so expensive.

Only a few crates were shipped to Power Center each month, and paid for more public and official planes than in any of the other Centers. A few of the factories in Textile Center, for example, were always taxed capacity, turning out the tithe to Power. Textile Center traffic, according to espionage reports, was three point two percent below Plastic. Food and Luxury Centers averaged slightly more, but they worked twenty-four hours a day.

What was the precious stuff, then, and what did Power Center do with it? Oh, well, it was their secret, and none had divined it—unless the outlaws knew.

The outlaws knew a great deal, as Cameron was beginning to suspect. He had not bothered his head particularly about them before—that was part of his province. As long as they stayed in the unmapped areas between Centers, and as long as they did not encroach upon his personal comforts, he regarded them much as everyone else—unlettered savages living like beasts. But he had never really believed in the stories of cannibalism.

After his unfortunate meeting with the dark stranger, though, thoughts of the outlaws had busied his mind to a considerable degree. The man was not savage, illiterate, brutal, cannibalistic. He did not fit at all into descriptions circulated by the Bureau of Information.

For the first time in his life, Cameron felt uneasy as he considered the eternal verities he had been taught since he entered School for

Officials. The feeling was not one of doubt—not yet. He was simply uneasy as shadowy questions swirled unformed in his head.

Was the man an outlaw? Was he from some other Center, pirating the most valuable product in the United States? It seemed unlikely, for he had laid down an ultimatum. No more women for Luxury Center.

In addition, the weapon he had used pointed to his being an outlaw, for if any other Center possessed that secret it would soon rule the others as Power Center had ruled before the collapse of Jorg Duvain's dictatorship.

Cameron flushed with anger as he thought of that invisible—and apparently invincible—screen. He must look into that. At his leisure if he could produce the spy who, he felt certain, was in this factory. If he failed in this he must produce proof of the weapon in order to vindicate himself before the council.

Cameron stood for almost an hour at the window. Orderly confusion on the loading field held half his attention. The other half was on the corridor.

When he heard footsteps he half turned so as to see whoever came around the corner and at the same time seem vigilant on his extemporaneous self-assignment. They came briskly clicking along the Neoplast floor, and brought slim-legged Ann Willis into view. Cameron turned full toward her then and waited.

When she recognized him she halted, frozen-eyed. Her pose, Cameron thought, was not indicative of displeasure—she listened, rather. She held herself tense and still for a full five seconds before she allowed her lips to relax.

"You're being foolish," she said softly. "But come in."

He followed her inside and took a chair at her invitation. He waited for a formal greeting and was somewhat surprised when she plunged briskly into conversation. True, he was an ordinary citizen, in brown, but she knew better. She knew he had worn police-blue all his life.

"What do you want?" she asked curtly.

Cameron told her. "There is a spy somewhere close to the top here. He has cost me my job. I have, as you know, a day or two at least in which to find him. I want to know who knew of *Fleetfin's* schedule and cargo. One of the names on that list will be a spy."

"How many names do you know?" she asked.

"Four. Grueter, Captain Jorgeson, the pilot, myself. There must be others. I'm not the spy. Jorgeson and the pilot died in defense of the cargo, and I hardly think Grueter would fit."

"What was the cargo?"

Cameron's eyes narrowed. "Don't you know?" he asked, astonished.

"I'm not in traffic."



"Then I don't know who else."

She was quiet, tapping coral nails on her desk. Her eyes turned a deeper purple with thought. Presently, she looked at him for a long time.

"You were tried," she said, "and found guilty."

Cameron snorted. "Tried! I was *informed* that I'd been found guilty."

She shrugged this away. "You have broken your parole."

"But it won't matter if I can prove my innocence. You know that."

"I know that you have been found guilty by a legal court. I know that it is my duty to report you."

Cameron's jaw dropped. "What's got into you, Ann? We were friends. You know you'd be sending me to my death."

Her gaze did not waver, her mouth did not relax. She continued to tap the shining desk top.

"I am first of all a loyal citizen of Plastic Prime. Whatever threatens it in any way is dangerous, from my viewpoint. You've broken rules of behavior."

"But they won't even ask questions if a report comes from you! I'll be dead in three seconds."

"As you should be."

As Ann Willis reached for her phone, Cameron acted instinctively. With one hand he slapped her fingers from the instrument and with the other, even as she reached for her coagulator, he hit her on the chin. All his strength, backed by the momentum of his ~~body~~ went into the blow, and she dropped to the floor.

He stripped off her side arm then examined her for life. He found that he had not broken her neck as he had thought at first. And he knew that he should have.

He stood, looking down at her lithe slenderness. Alive, she was his own death warrant. Therefore, she should die. He picked up the coagulator.

He didn't point it. He knew that he would not. He knew, in a surge of self-contempt, that he could not. Some atavistic reversion, no doubt, and all the more contemptible for that. His contemplation of the girl was not æsthetic. He wasted no appreciation of her curves. He felt only that he was a fool.

If he didn't kill her he should have to run for it. Where? He could hide in Luxury Center for a while, but nowhere else. As soon as she recovered she would send Josh Cameron's personal data to all Centers, but authorities in Luxury were lax. They'd make a half-hearted search in the tourist spots and then wait for him to show himself.

He told himself that she must be killed or his own life was forfeit. He told himself this several times. Yet he did not move his arm, did not aim the weapon.

No, he was going to let her live, and eventually

bring him to death. For, even though a trip to Luxury, provided he could get out of Plastic, would offer brief respite, he could not find the spy. The spy was here, and without an ally on the ground Cameron could not run him to earth. He could have no ally. He, ordinary citizen, had struck the purple uniform. All hands were now against him.

With some despair and hopelessness he began to search the office for a disguise. In her closet hung several of her own outfits, but he could wear none of these. Not that he couldn't masquerade as a woman—though rather flat-chested; he could do it, but not in these costumes. For any woman with knees like his would wear a long tunic. Let him appear in public as a female with these knobs exposed and even a child would know something was wrong.

One course was open. It was one of desperation, but he could not pick and choose. He searched her desk, found a small scissors, and cut a purple star from her skirt. He pinned this to the belt of his shorts and slung the coagulator on his hip. He was a reasonable facsimile of an executive messenger, and the weapon gave authority to the disguise.

He took her purple pass from her tunic pocket, stowed it in one of his own. Then he tied and gagged Ann Willis. He was careful about this. He needed about thirty minutes to catch the next passenger plane. After he was aboard, it mattered little when she was free and conscious. When the alarm went out they would go first to his own apartment. By the time they had checked the ports he should be lost in the pleasure-seekers of Luxury Center.

So he tied her well.

### III.

When the plane had been clear of Plastic Center's shield for an hour, Cameron had examined each of the passengers and was satisfied that he was free of suspicion. A few eyes had looked at him with interest, but when they touched on his makeshift star and coagulator, they had become blank with acceptance of things ordinary.

One pair only shifted back to him now and then, but these were red-rimmed from caltra, and Cameron felt sympathy for their twisted owner—if he felt anything. The young man wore the honorary purple of those who had not been warned in time that the drug was not harmless, as advertised, and Cameron attached no importance to the glances directed at him. Caltra victims did strange things.

His complacency was shattered somewhat when the young man staggered along the aisle to the empty seat beside Cameron and fell into it. Cameron's desire to be left alone was passive, but it

tricked along jittery nerves. Yet he controlled himself, took his cue.

"I am happy to see you," he said respectfully. "May I offer my service?"

The young man clipped out the formal reply. Then, "Been watching you," he said.

Cameron's dark face remained placid. "Yes?"

"You want a job?"

Cameron examined the red-rimmed eyes for signs of double meanings. Then he touched his purple star.

"I have a job."

The young man shrugged this away. "Delivering a message isn't a career. I'll fix it so I can hire you. I'll pay you in money, not credits."

Cameron murmured, "You tempt me," and began a tale of fanciful reasons why he was not free to take any employment from a private source while he concentrated on this unexpected situation. With an eye on the Sierras, over which they were flying westward, he spun a smooth tale of his own importance in the scheme of things.

His private thought had a tone of hopelessness. If this young man were determined to hire him, for whatever purpose, Cameron could not stall beyond a certain point. He could not prevent inquiries, not in civilian brown. And he could not allow inquiries—and live.

The young man interrupted his tale. "Don't be a fool! Any halfwit can replace you. I like your looks and can pay more than your job pays. What's your name, and who employ you?"

Cameron touched his star again. "I claim secrecy."

The young man bowed. "That is your privilege. But what is your name?"

"Jay—Cameron."

"J for what? John?"

"Jay. J-a-y."

"All right, Jay Cameron. What are you paid?"

Cameron named a reasonable sum.

"I'll double it," the young man said.

"For what? What would I do?"

"Help me. Accompany me. Protect me, if necessary. I am headed for dangerous territory."

Cameron raised his eyebrows. The young man leaned near and whispered, "I'm going into outlaw country."

Cameron shook his head. "I don't want to be disenfranchised. I'm a loyal citizen."

This was the normal reaction, and his companion seemed to find it so. "Sure, sure," he said impatiently. "So am I. But I'm also a man, and I don't like my physical condition. It happened through no fault of mine. I was told caltra was non-habit-forming—which is true—and that it was harmless—which was a foul lie."

"But Food Center didn't know that," Cameron pointed out, "when they offered it as a substitute for morphine."

"The effect was the same—on me. I'm not sore at anybody. I just want to be cured."

"But there is no cure. The effects are permanent."

The young man smiled. "I saw a case— Never mind. I'll tell you when you're working for me. What do you say?"

Cameron saw a way out. "I'm going to Luxury," he said, "on business. After I've finished I can talk to you."

"Good! I'll meet you at . . . oh, you name it."

"Rosie's?"

"On the canal side? Right. My name, by the way, is Harvey Willis. Plastic Prime."

Cameron shriveled a little. Willis. Plastic Prime. Intellectually, he felt certain that Ann Willis and this twisted wreck had nothing but the accident of name in common. But the emotional shock, since he had violated her purple sanctity a short hour before, almost destroyed his composure. He was quiet for a few moment until his hands relaxed.

Not only, he reflected, would he not meet this man in Rosie's, but he would also throw a scare into him, make him wish to forget Josh Cameron.

"It is my duty to report you, Mr. Willis. You're planning a violation of the law."

Willis smiled tolerantly. "They wouldn't do anything to me. I'm a caltra victim. You know that I'm immune. But aside from ethical considerations, Cameron, let me ask you something. Are you color-blind?"

Cameron's jaw dropped. "Huh?"

"You've probably forgotten an important fact," Willis went on obscurely. "That fact is the varied effects of caltra. It does strange things to its victims. It has made me superhumanly sensitive to gradations in color. And so—" He leaned nearer and whispered, "I know that your messenger's star is a phony."

Cameron's face didn't move.

"Your complexion," Willis went on pleasantly, "is a trifle whiter. I tell you honestly, Cameron, I can read these signs. I don't need to be a psychologist. You're scared. You know, of course, that it is my duty to report you."

"Go ahead."

Willis screwed up his face. "Your tone sounds all right to me. If I were blind I'd say I'd made a mistake. But there's an additional whiteness. You see, my approach was not impulsive. I didn't pick you without a great deal of thought. First of all, I noticed the star. It's almost the same shade as the bona fide, but not quite. So I knew you were disguised. Now anyone wearing brown who will take such a desperate measure is not only in trouble, but he has initiative and courage. I may have need of those qualities. And you can't refuse me, Cameron. A word from me and

you'll be held at the landing port."

"But you took caltra, and are, therefore, crazy."

"True. But they will investigate you, nonetheless, with many apologies. 'Merely routine,' they will say. 'We hope you won't hold it against us, because you are an executive messenger on a mission of importance?' Can you stand investigation, Cameron?"

Cameron smiled wryly. "Caltra didn't impair your argumentative faculties. At Rosie's, then?"

"I think," Willis said, "we'd better not separate. You aren't on an executive mission, or any other kind. If you get away from me I may never see you again. I could get someone else at Luxury, of course, but I'd rather have you, for reasons I've stated."

Cameron frowned. "You put me in a bad position. If you should be right—assume it for the sake of argument—and I admit it, you have a hold over me which might cost me my life. If I deny it you'll cause me to be held up, and maybe cost me my job. You'll interfere with my mission, in any event."

Willis shrugged. "You must make the choice."

Cameron brooded out the window. They had left the Sierras behind and in a few moments would arrive at the canal-striped city, Luxury Prime. Before that time he must come to a decision. Not a decision on his course of action, for Willis had him. He must string along.

No, he had no choice there. What he needed now was a story, one that would salvage something of independence and self-respect. He considered plausible lies. He could say, for example, that the circumstances which Willis had created forced him to accede to the young man's demands. If he were held for investigation, his mission would be unsuccessful and he would lose his job. Therefore, he would be better off to grab Willis' offer and thus save a means of livelihood. No, that was weak.

He turned to Willis. He had a story now. "I'll have to trust you."

Willis made a gesture. "That's up to you." He seemed amused.

"No," Cameron said. "I must. Will you swear by the purple to treat it confidentially?"

"Surely. I swear."

"Then lean closer. I must whisper." He did so. "I am not an executive messenger. You were quite right. Nor am I a civilian. I have a right to wear another color. I am on a highly secret errand, and as long as your route coincides with mine I'll go with you."

"Why," Willis asked, "the artificial star? If you're on official business you could get the real thing."

"And fill out an application for anybody to see?" Cameron smiled. "Not much. Only one

other person knows what I'm about. You're the third."

Willis was apparently convinced. Cameron had no way of knowing the mental reservations the young man made. He had to accept Willis' vows of secrecy, his protestations of belief, his offers of assistance.

He watched Willis stagger back to his seat with the peculiar gait of the caltra victim and tried to still the uneasiness which threatened to engulf him.

Red was the hue of hunting. The military were after somebody and Cameron thought he knew the name. Though he had been bitter, upon arrival at Luxury, at the liaison he was unable to avoid he soon had reason to bless it.

For the pleasure palaces were no sooner lighted and opened for the evening than red uniforms added their sinister note to the general gaiety. Alone, Cameron reflected, he should have been questioned. But he was employed and his employer could answer questions.

Chief among his blessings, then, were the ravages of caltra upon Harvey Willis. Nobody bothered to question. If he wanted a valet—and Cameron became obviously that—they assumed he had the permission of authority. Additionally, the general attitude toward caltra sufferers imparted a certain immunity to formality. The guys might be nuts. No telling what he'd say.

So the search swirled and eddied around Cameron. At the gaming tables, where Willis won a tidy sum on a Galactic Wheel; on the canals, where their power canoe was unmolested at Rosie's and similar houses, where their badinage with former outlaw girls was uninterrupted.

The soldiers gave them casual glances—and passed on. Cameron ached to question one, to learn if the net was out in all Centers for him, if Ann Willis had spread the word, if he were to be killed on sight. He was morally certain that such was the case, and shrank inwardly each time a military eye raked him. His star and weapon he had discarded upon arrival. They would be the focal point of the search. He had thrown the star away and hidden the coagulator under his shirt.

He strove with all his faculties to maintain the appearance of a hired companion to Willis on a pleasure tour of the spots. He steadied the young man as they roved about this hall or that; he helped him into hired canoes when they moved on to another; he held their pace down to the leisured movement of Luxury Center, so snaillike in comparison to other Centers.

Here, efficiency was subordinated to enjoyment. In Luxury Prime, all business was directed toward comfort of visitors. Proprietors bowed and pleas-



antly relieved gamblers of their vacation funds. Canoe chauffeurs were vocal upon the beauties of their environment. Girls in the licensed houses were gentle, intelligent, and as willing to argue economic, astronomical or mathematical problems as to engage in any other pastime.

Nothing was allowed to mar the periodical visits of customers. Here were no actors, artists, or other social nonentities. They were segregated in subsidiary communities. From Luxury 1 emanated all stereocasts; Luxury 2 produced such sculpture as this or that Center required; and so on. Those who were doomed to a life of artistic endeavor kept their places. They did not mingle even with ordinary citizens.

Nothing, then, should have prevented Cameron from enjoying himself, once he was satisfied that the military was apparently not suspicious of him. But Harvey Willis worried him. Drifting with seeming aimlessness from place to place, the young man led them gradually toward a section not frequented by tourists. This was a district of

as he helped Willis from a canoe to a gloomy sidewalk.

Willis expressed surprise. "Why not? The places are open for business."

Cameron explained.

"I have special privileges," Willis said lightly. "I don't imagine there'll be a row. Besides, I have to arrange my journey down here."

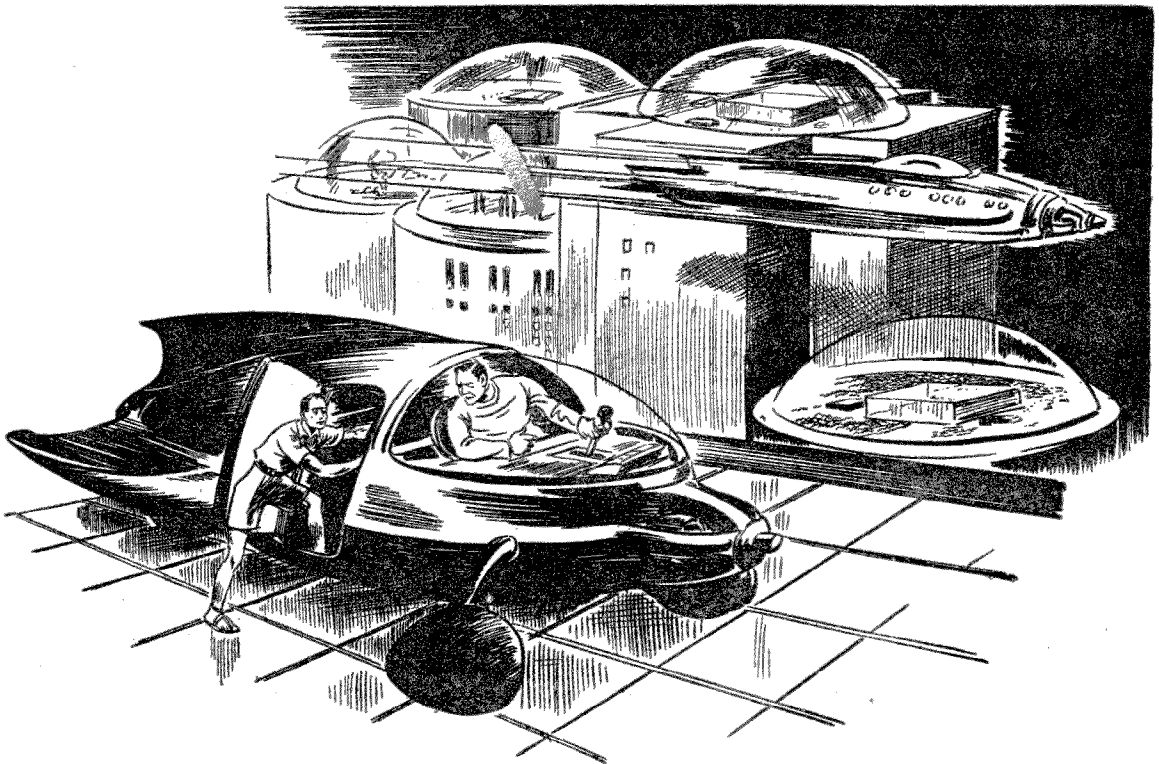
Cameron pulled the young man to a halt. "Look here, I'd like to know what's up. If I'm to be involved I'd like to know in what."

"I told you," Willis said softly, "I'm going into outlaw country—to be cured."

"But that's impossible. I'm sorry but it is. You're due to be duped."

"I know the popular theory," Willis said impatiently. "But there's a doctor, an outlaw, who has figured out a cure."

"Outlaws," Cameron scoffed, "know nothing of medicine. Besides, he could get amnesty if he had something like that. He could move right into Food Center's medical department."



small private bars, designed for the army of workers and officials who lived in Luxury Prime.

Not that one was ever cautioned not to enter its environs. No, one was allowed to enter all right. And having entered, was tolerated. Nobody contributed to the casual visitor's entertainment. He could buy a drink and drink it alone. Nobody was interested in how much money he spent.

"We don't belong down here," Cameron said

Willis motioned toward a small bar, dimly lighted, and Cameron helped him to the door. "Has it ever occurred to you," Willis asked as they approached, "that he might not want to go back?"

"God, no!"

The bar was deserted save for a rotund barkeep with a laughter-scarred face and a paunch. He

and Willis went through an elaborate ritual of greeting before the two men sat at a small table. The bartender wiped its spotless plastic top with an immaculate cloth and said:

"Gentlemen, I know you're visitors, but I like the set of you. Tell you what. I'm the only bar owner in the country with a little Scotch. Would you like a drink of it?"

Cameron had heard of the liquor from his grandfather, who had boasted that the Camerons had once made it, so long ago in Scotland that the date was forgotten. His dark face lighted with remembered excitement.

Willis likewise signified his acceptance, and two small glasses of amber liquid presently sat before them, each ringed with a necklace of tiny bubbles. Cameron sipped.

"Tastes like smoke."

Willis closed his red-rimmed eyes after a taste. "That, friend Cameron, is a drink with character. It's warplanes slipping grimly through the night, it's a storm with sand in its teeth, it's a pardon from the High Court. I like."

The liquid was filled with an intimate flame, warming Cameron's stomach. He relaxed and seemed to view with great clarity his own situation. He tossed the remainder into his throat and looked at Willis with determination.

"I'm a coward," he announced. "I'm running away. Me, a Cameron. I'm not running any longer, though. I'm going back."

"To what?" Willis asked sardonically. "I'll tell you. Death."

Cameron flung up his head, nostrils flaring. "I can take 'em on, one at a time, or all together. I'll use strategy, cunning, and finesse. I'll expose the spy. I'll prove I had nothing to do with the dirty outlaws. They can't do this to me! Then, when I'm chief again, I'll deal with the outlaws. You'll see, you'll—"

He slumped forward on the table and the bartender came across the room.

"You haven't killed him?" Willis asked.

The bartender's paunch jiggled and his big face creased along worn lines. He chuckled.

"Lord, no! He'll have a head big as a pylon dome when he comes to, but he'll live."

"What did you give him, for heavens' sake? It took him almost as quickly as a coagulator. Speaking of which—"

Willis took Cameron's weapon, questioning eyes on the bartender.

"A long time ago, Mr. Willis, it was called a Mickey Finn. People used to drink 'em." He shook his head sadly. "Those must have been the good old days, when men were really men."

"Is everything all set?"

"The boys ought to be here in a couple of minutes. You did all right, Mr. Willis. Pier is going to be pleased."

Willis shrugged. "Did Ann call in?"

"Yup. I wrote down the Shield combination. Says she's got a sore jaw. He must've slugged her."

"I don't know. She called me at the last minute, said to take the Luxury plane and capture Cameron. What were all the soldiers doing tonight?"

"Rumor that Pier's in town, I guess. We get 'em every few days. A couple were in here. Gave me six credits to tip them off before anybody else."

They were still chuckling when a quartet of men came in silently from the rear. With quiet, unhurried efficiency, they carried Cameron away. They accommodated their pace to Willis until they reached a large power canoe. They piloted this at normal speed along the canal to a dark, deserted stretch. Here they hid the canoe and carried Cameron across a field to a long, rakish craft which was rising slowly from an underground hangar.

When Cameron opened his eyes, some time later, one fact registered before vast aches and pains invaded his consciousness. The face of the pilot was that of the dark stranger who had robbed *Fleetfin* of her precious Baltex.

#### IV.

Somewhere in the Pacific. That was all Cameron knew about the island to which they took him.

It was broad and long and green. He could see all this as they circled high above it at dawn of the following morning. It was apparently deserted. Bright-green vistas, craggy brown hills and curved white beaches met his eye through the observation port of the outlaw craft.

That was all he knew, aside from the fact that the dark lean pilot was Pier Duvain, outlaw chieftain, and that Harvey Willis was also a personage among the outlaws. They told him nothing except to be quiet.

He found this command easy to obey for his head was filled with pain and each movement brought a myriad stabs to his joints. Even thinking was agony.

So he took what restless slumber came his way, and in the foggy dawn looked down on the island. Were they going to drop him there, with no company save its native animals and insects? If so, why? What was he to them?

The lean plane knifed through the fog toward thick green trees and settled to earth in a small clearing. From the sides of this men came running with armloads of greenery, and before Cameron was ordered to disembark the craft was covered with an effective screen of leaves. From above it was surely undetectable.

He was escorted without comment into the forest, expecting anything but what he saw.

For here was a modern city, modeled along the lines of those Cameron had known all his life, but with subtle differences. The buildings were designed to blend into their surroundings and were protectively colored. The streets followed the natural contours of slopes and valleys, and looked like swaths of vegetation.

The principal difference was a *feel* of camaraderie. Hundreds of persons were abroad, even at this early hour, and they looked at you. That was the keynote—their eyes met yours. They didn't glance furtively at your costume, ready to avert if necessary, and quickly away. Their eyes were full of candor.

They spoke, too, in casual greeting. They said, "Hello."

"Hello, Pier," they called to the outlaw chief. And, "Hey, Harvey," to Willis. "Haven't seen you a long time."

Nor did these people look brutal, or barbarous, as Cameron would have expected. They were like anybody else save for their spirit of banter and their proud glances.

Cameron was still with wonder and a reorganization of conditioned ideas. He had been taught this and so about the outlaws; what he saw did not confirm the teaching. He was confused and went quietly with his escort.

They led him into a long low building with opaque plastic walls, down a corridor bright with synthetic sunlight to a room which was built around a council table. It was obvious that this room played an important part in outlaw affairs, and Cameron studied it.

He had seen its counterpart, generally speaking, in all the Centers. His own office had been so constructed. But there were differences here, too, as there were in the people. This plastic had never come from Plastic Center; nor the floor covering from Textile; nor was the lighting characteristic of Power's product.

Pier Duvain dismissed the two crew members who had accompanied them, waved Cameron and Willis to chairs, and sat across the polished table. His dark eyes held surface amusement, but fires glowed deeply, and his tone was not as casual as his words.

"I suppose you'd like to ask some questions," Cameron twisted his mouth. "Fat lot of good that would probably do."

"Oh, yes," Duvain said. "You'll get answers. Correct, too. We'll be glad to tell you anything." Cameron leaned forward. "All right. I'll ask you a question. What are you intending to do with me?"

Duvain's eyes were steady, unblinking, though not unpleasant. "That depends on you, and is not a subject to concern us yet."

"Depends on me? How?"

"We won't discuss it. Anything else, however,

I'm willing to talk about for—" He glanced at a wall clock. "For twenty minutes."

"Where are we?" Cameron asked.

"On an island in the Pacific."

"I could see that." Cameron's voice rose. "You'll tell me everything, you say. So I ask about what most concerns me, and you tell me nothing. Suppose I don't ask questions. Suppose I just listen."

Harvey Willis turned red-rimmed eyes and a conciliatory smile on Cameron. "Now, now, friend, no need to get worked up."

"You and your outlaw doctor!" Cameron grated.

Willis shrugged. "I had to tell you something. That was as good as anything else."

"There isn't any doctor?"

Willis hesitated. "I wouldn't say that, exactly. Let's say, rather, that he has not been successful as yet."

His captors were silent while Cameron frowned at his folded hands. They waited, courteous but at ease, as if he were an honored guest. Presently he raised his eyes to Duvain's.

"Look here, I'm confused. This seems to be more than a matter of accident or coincidence. For some reason you intercepted me and brought me here. Why me?"

"We need men like you, Josh Cameron. You have qualities of leadership. If you have other qualities as well, you can be of assistance."

"In what?"

"In overthrowing the master-slave system in the Centers. In making all men equal."

"You're insane!" Cameron said.

"Do you really believe that, Cameron? Truly?"

Cameron studied the dark lean face. He remembered his first impression as Duvain came toward *Fleetfin* from his own plane; remembered the vitality, the arrogance, the self-assurance. These characteristics were more pronounced here at close range and were subordinate to some calm determination that radiated from steady eyes. Insane? Surely not.

"Well," Cameron hedged, "what else would you call such a proposition?"

"You could call it fair. You could call it just."

Cameron vented a short explosive sound of derision. "You sound like . . . when was it? . . . the eighteenth, twenty-first, or some other early century. All men equal! Fat chance!"

The outlaw was pleased. "You know history?"

Cameron remembered his pangs as Captain Robert Fane had confiscated his reading tapes. He didn't mention them. "A little," he said.

"Good! You won't have to go through elementary training then. You know that there was a time when a man's costume, or badge, or whatever, did not rigidly limit him to a certain social class. You remember?"



"They outgrew it, though," Cameron replied.

"Didn't they just!" Willis put in bitterly. "Look at me. I have a special purple. So I'm useless—because of the uniform and not because of actual disability. There are many productive jobs I could handle, but because I have this shade of uniform I'm barred from them. Look at you. You're in civilian brown. Are you the same man you were?"

Cameron frowned. "From the standpoint of the State, no. I'm not the same. I have no authority any more."

"Are you the same character, though? The same personality?"

"We-e-el," Cameron said. "I suppose so. Listen, I see where your argument is leading, and I can't refute it on your grounds. But I still say it's wrong. We've been going along pretty well for several hundred years in this way."

Willis spread his twisted hands, palms upward, and shrugged his shoulders. "What was good enough for father is good enough for you, eh? I can't argue with stupidity."

Cameron flushed, rose to his feet. "Quit patronizing me. I'm not a child, but I'm not a half-crazy idealist, either. I don't subscribe to your theory. My primary interest in you is what you're going to do with me. I'm your prisoner. Why do you bother to argue? I wouldn't, if our positions were reversed."

"Sit down, Cameron," Duvain said quietly. "I thought you were intelligent enough to see the justice in our project. I still believe you are, but you'll need to shed the master-slave conditioning first. We're not going to do anything with you. You're at liberty."

Cameron remained on his feet. "I can go back?"

"To what?" Willis asked. "You'll be shot down for breaking parole."

He was right, Cameron reflected. Unless—

"Yes," Cameron admitted, while a plan formed in his mind. If he were in a position to bargain, if he could expose the outlaws, they wouldn't shoot him down. "I suppose you're right," he said with pretended despair. "I can't go back, I guess. Well, you say you want me to help overthrow the Centers. How do you propose to go about it—and when?"

Duvain and Willis looked steadily at each other. There was tension between them, conflict. Friendly, yes, but deep and unyielding. Duvain's dark eyes were like black plastic; Willis', blobs of blue, circled with red.

"We have a difference of opinion," Duvain answered. "One faction advocates violence, a quick thrust at the military. But another, headed by myself, contends that we should merely substitute one evil with another in that way. I have no definite plan to offer as yet, but I believe there

is a way aside from killing off the opposition."

"Look at Cameron," Willis broke in. "You can't educate him. Oh, in time you could, perhaps. But there are millions like him. It would take forever."

Cameron was astonished. "Who's the boss here, anyway?"

"I am nominally the president," Duvain answered. "But each member of our organization has an equal vote."

"That's appalling!" Cameron exclaimed. "You'll never accomplish anything. What kind of business do you call that?"

"We call it Democracy, Cameron."

"Rubbish," Cameron said. "Democracy is what we operate under in the Centers."

Both Willis and Duvain loosed explosive laughter.

"We have a United States Congress, don't we?" Cameron said. "We have a council in each Center don't we? They're elected by the people."

Duvain rose, a friendly smile on his dark face. "I wish I had time at the moment to argue the point, but I haven't. I hesitate to leave you with Harvey because he'll convert you to his creed of violence. But—"

Cameron interrupted heatedly. "Why will anybody necessarily convert me to anything? I'm an individual, the same as you. Aside from theories, though, I don't believe you could conquer the Centers. You're not strong enough."

"I'll set you straight on that right now," Duvain snapped. "Within twelve hours we could be in absolute control of all Centers. We are strong enough. This island is only our capital, so to speak. There are millions of us on the mainland nomadic tribes living between Centers. Oh, we could conquer, all right."

"Then why don't you?"

"We have a difference of opinion as to procedure. But we're in no terrific rush. The Centers will still be there when we're ready."

"You can't break through their Shields."

"We have. We do. We can," Duvain glanced at the clock again. "I must go."

"I'd like to ask one more question," Cameron said. "How do you get through? How did you know about that shipment of Baltex?"

Duvain smiled, flicking his eyes at Willis. "Harvey's sister knows about such things."

"Ann Willis?" Cameron exclaimed. "So she's the spy! No wonder she was going to turn me over to the military. But how—"

"She wasn't," Willis cut in. "When she reached for the phone she was going to call me. But when you hit her she decided to play unconscious and give you a chance to get away. You tied her up almost too well. I barely made that plane."

"But what if I'd gone somewhere else?"

"We had the other ports covered."

Duvain said impatiently, "Look around, Cameron. See how we live. I'll see you tonight."

Cameron looked at Harvey Willis after Duvain was gone. "Well? What do I do now?"

Willis shrugged. "Whatever you like."

Cameron marveled a little at their indifference. One of the Centers—in Plastic for example—he would not have been willing to let a prisoner wander. He thought again that if the conditions were reversed—if he were the captor and Willis Duvain the captive—another death would have been recorded before this.

He had this nebulous idea of escape. If, he reflected, he could expose Ann Willis, he might get back his job. He needed more information than he had now, for it would be his word against hers, and she was an executive. He needed proof of that destructive screen which he had seen in action.

"So you're the head of the violent faction?" he asked Willis.

Willis apparently did not sense that Cameron was merely making conversation. He treated the question seriously, clasping his hands in that odd manner necessitated by their twisted condition.

"Yes, but I admit that I may be wrong. Pier has a great deal on his side."

"Ah?"

"You, for example, friend Cameron."

Cameron frowned. "I don't get it."

Willis smiled with faint amusement. "You can't see it? You were discharged, according to the rules and regulations of our culture. But you rebelled."

"I rebelled? Against what?"

"The master-slave set-up. You didn't take your medicine like a loyal citizen. You set out to prove your innocence. To that degree, you rebelled against the culture."

"But the charges were false!"

"Who believes that, besides you? Haven't you seen others discharged when our obsolete councils judged a criticism against them? Haven't you accepted that procedure as just?"

"Yes, but—"

"But you're different, eh? And so you are. You rebelled. You were an outlaw from the moment you decided to reinstate yourself. You are an outlaw." Willis flared twisted fingers as Cameron made a hot protest. "Think it over, Cameron. Look around. Go through our streets. Watch us. Then make up your mind."

The differences Cameron had noted upon arrival—the differences in attitude, architecture, and general feeling—between the outlaw capital and any Center—were more apparent as he walked leisurely along the green streets which must look like grass from the air.

He did not enter any of the low, chameleonlike buildings. From some of these came sounds, as if those inside were manufacturing some article or another. Time to look into that later. At the moment he was interested in the people.

They wore a variety of dress, designed apparently to blend into the natural environment. The patterns were not standard, nor were social classes discernible as in the Centers. All walked as equals.

Cameron was distinctly uncomfortable in this unnatural absence of formality. When he was greeted pleasantly by some stranger who walked and talked like an executive, it was with effort that he restrained himself from saluting. He wanted to get away from this place.

He did so. He followed one of the streets paved with that strange substance as hard and smooth as Textile Center's best, which curved along the base of a hill and came to an abrupt end at the forest edge. A path slanted off from this point and Cameron followed it into the quiet green gloom.

It took him through thick trees and between walls of underbrush. As he walked he pondered his situation. He was conscious of heavy odors and bird movements in trees about him, and though these were strange and would have been exciting under other conditions, he kept his eye on the rising path and pulled his brows together in thought.

Pier Duvain, he suddenly realized, was the answer to all his problems. If he could turn the outlaw chief over to constituted authorities, Cameron might ask what he wished of any Center. Pier Duvain was their big headache. Cure it, Cameron reflected, and any job he liked was his.

Accomplishment of this project presented difficulties, to be sure, but was all the more worth consideration. Cameron doubted his ability to capture the outlaw and return him to the mainland, but if he, Cameron, could escape by one means or another, he could lead authorities to this island.

He marched on, upward, oblivious of the occasional bird he flushed, or the occasional rabbit that fled into the underbrush, until he reached the top of the path. He stopped and caught his breath.

A beach on the eastern side of the island shone in morning sunlight below him. Moored to a pier, apparently unguarded, were several sleek water craft. Here was a means of escape!

He stood motionless, examining the pier and the boats for signs of life. He saw none, heard nothing but rustlings of the forest, faint slap-slap of waves against the plastic pilings. He began the descent along the twisting path.

Every nerve was strained. He strove to detect life aboard the craft, for it was incredible that



they should be unguarded. He sifted all sound that came to him, and though much of it fell strangely upon his urban ears his instinct labeled it as strictly natural.

When he stood at the bottom of the path he searched the curving beach and the hill behind for watchers. Then he hailed the pier.

"Hello!" he called. "Anybody home?"

His shout cut off all bird cries, and an utter, weird stillness fell around him for a few seconds. Then the normal sounds began again and Cameron decided to make a run for the pier. If any unseen guard was behind him he might be able to make a quick escape. If he encountered anyone on the boats or pier he would adapt his actions to circumstances.

As he struck out through low bushes he frightened a cottontail rabbit. The little animal streaked ahead of Cameron as a shout rang out behind him.

"Stop!" a thin voice cried.

Cameron plunged ahead. He saw the rabbit jump erratically to one side, then back, and it

seemed to him that it cried out in terror as he rushed toward it. Then it leaped straight for the beach—and vanished in a small but brilliant flash with a sharp *crack* like an explosion.

Cameron knew what had happened. He remembered the screen of invisible death into which Captain Jorgeson and the pilot of *Fleetfin* had plunged. Here was another. He tried to stop. He dug his heels in the slick grass. He slid. He threw himself to one side and grabbed a small bush.

This strained, pulled half out of the ground, but held. He sat up, heart pounding, and saw that no more than a yard beyond his feet, where beach and vegetation met, was a line of shifting sand. Dancing grains, as if a million tiny animals burrowed from below.

He sat quietly, regaining his breath, but almost jumped out of his shorts as a voice spoke in his ear.

"What's the matter, sonny? Don't you like it here?"

She was an old woman. Incredibly old, Cameron thought as he scanned her deeply lined face. Yet her eyes were bright and she stood as erect as a young tree. Her legs were skinny but straight.

She began to laugh. It was a high cackle and brought a flush to Cameron's cheeks. She slapped her hip. She bent double.

"Never saw anything," she gasped, "like you hanging on to that weed."

Cameron rose with what dignity he could muster, brushed himself, and stepped back from the mark which indicated that deadly screen.

## V.

"You're Cameron, I suppose," she said. "Well, you're my prisoner." Her wrinkled old face, which looked something like a pair of old civilian shorts, lost its previous amusement. She laid a clawed brown hand on a weapon at her belt. "I mean it," she said. "You're no use to us as long as you're against us, so I won't mind killing you like . . . like that poor little bunny. March up to my shack." She waved toward the forest edge, high on the rim of the hill.

Cameron obediently scanned the hillside. The old lady's tone had an edge to it. She meant what she said. Or so Cameron felt, so strongly that he did not care to gamble his life on the chance of her bluffing. He looked at the hill.

"I don't see any shack."

"To the right of the path, about thirty feet."

He saw it, then, cunningly blended into the trees, and started toward it. She followed briskly, skinny legs which seemed to rattle around in her shorts moving with the energy of youth.

"You can call me Gran," she said, "like the others do. I'm Pier's grandmother, and you probably know about me saving his father when Jorg was killed."

Cameron blinked. The revolution had occurred more than a hundred years ago.

"You can't be," he said. "You'd be a hundred and . . . what . . . thirty, fifty . . . years old."

"Hundred and forty," she said crisply. "But don't get any ideas about escaping again. Don't let these white hairs—what's left of 'em—mislead you. I'm plenty spry, and I've seen all the tricks. Used 'em, too. So behave. I won't fool with you."

Cameron believed her. He walked carefully along the path to the door of her "shack." This was of unglazed plastic, rising to a transparent dome level with treetops. He waited while she blew a two-tone whistle behind him and the electrosonic door slid upward, and obeyed her command to step inside.

A gray squirrel chattered angrily at him from a swinging perch and a fat white cat, curled on

a cushion in the far corner, opened one green eye for a second's scrutiny.

"Oh, shut up!" Gran Duvain said with fierce tenderness to the squirrel. "Into the elevator, Cameron. Face the wall."

Cameron followed instructions. She entered behind him, closed the door, and they rose to the observation and control room of this sentry shack.

"Sit there in the corner," she commanded. Cameron sank into the chair, watched her touch various buttons on the panel below the seaside window. "Now," she went on, "the screen is between me and you. As long as you sit still you won't be hurt. But don't get out of the chair. Wait a minute though. Might as well make it visible."

She twisted a dial, touched a glowing stud here and there, and a transparent green curtain formed before Cameron. It hung unsuspended, not quite touching ceiling, walls, or floor, but completely hemming him in. Cameron's short hairs stiffened and a little chill touched the back of his neck. He did not intend to move.

"I think you know what will happen," the old lady said pleasantly, "if you try to jump through that screen. I want you to sit still and listen. Pier and Harvey vex me now and then. Turning you loose, indeed! They can't imagine anybody wanting to get away from here. They don't understand your conditioning. They didn't think you'd make a run for a projection."

"Projection?"

She waved a withered hand out the window. "Look!"

Cameron saw the pier, the sleek, shining boats. Her hand moved, touched a stud on the panel. The boats vanished. Cameron caught his breath.

"Did you think we'd actually anchor anything out there?" Gran Duvain demanded. "I played a hunch you'd run for it. Told 'em so. Wish you hadn't flushed that rabbit, though," she added sadly. "One of my favorite pets."

"If I hadn't," Cameron said, "I'd be dead now."

"But I'd still have my pet," she countered.

"Well, since you're here, might as well make something of you. Don't interrupt now."

"I'm no child!" Cameron protested.

"Are to me!" she snapped. "At least three times your age. Going to tell you what's happened in the last two hundred years. Make your own choice then. Got any brains you'll throw in with us."

"I've read a lot of history," Cameron said. His tone was resentful. He didn't like a useless old woman pushing him around.

"Read!" she scoffed. "Sonny, I've *made* it. And watched it, too," she conceded. "I wasn't the only one making it. When I snatched Pier's father, Jaques, from a firing squad, though, I started history in motion. You don't know about



Jaques. He turned out to be an artist."

That she would admit such a fact about her son shocked Cameron. His expression must have indicated his thought for her mouth became an invisible line among the wrinkles.

"Was a time," she said fiercely, "when artists were honored. Didn't know that, huh? Shut up now! Don't care what your views are on anything. Know who Randolph Williams was?"

Cameron searched his memory. "There was a General Williams—"

"Right! First military dictator of the United States. Wasn't there, myself. Don't know whether it was justified or not. Guess it was, though. Country in a mess after another world war they managed to stir up every twenty-five years or so. Know what he told 'em, though? The people, I mean?"

Cameron blinked through the green veil. "Why, uh—"

"Be still! I'll show you."

She opened a wall closet, took out spools of film and a projector. She fitted one into the other with firm and expert hand, and drew a dimensional screen over the far wall.

The three-dimensional, four-color image was that of a big man with a jaw, in khaki and medals. He thrust the jaw forward, put one brown hand on the gaudy chest display.

"This is a Democracy," he asserted. "Always has been, always will be. Martial law, which I declare here and now, is necessitated by an emergency. You will hear charges of dictatorship flung at me. I will be called Randolph the First. These charges will be silenced, their makers imprisoned if necessary. I give you my solemn promise as an officer and a gentleman that as soon as the present emergency has dissipated, the same government will be restored that has guided this nation in her glorious past. I—"

Gran Duvain stopped the projector, blanked the screen.

"Rest of it's the same bunk," she said. "Know what General Graham said? He was the next, after Williams drunk himself to death one night—or was poisoned."

"Well—" Cameron began.

"Same thing," she interrupted. "And so on down to Jorg. He wasn't dictator when I married him, but he was headed there. And you know what? He believed all those others. He thought they meant what they said. And when he stepped in he started to restore the Democracy, started to return the power of government to the people where it belonged. Well, you know what happened to him. The Four Companies got him."

Cameron frowned but said nothing. Her story did not coincide with history as he had learned it, but he was silent. There was something about

her that commanded attention.

"You don't know about them either," she went on. "They began to grow shortly after the first dictatorship and developed into the Centers, excepting Luxury. The big power companies merged into one and formed Power Center, from Canada to Mexico on the east side of the Mississippi. Textile took the east coast, Plastic west of the Mississippi, south of the Lakes. The farm combines took the rest, except a little spot on the West coast where they shipped all the artists."

"May I ask a question?" Cameron asked.

"Sure, sure. Maybe you got sense, after all, showing an interest. What is it?"

"You say the Four Companies got your husband. Wasn't the military in power then?"

"Then? Never has been. Isn't now. Who do you think runs the Centers?"

"Why, the courts and—"

"Tosh! Listen, sonny. Let's see, you're from Plastic. Martin Grueter and the other mill owners are Plastic Center."

"But they're only executives."

"Only? Listen. Right after Randolph Williams went in, wasn't long before the Supreme Court died off or was retired and General This and Colonel That replaced 'em. Same all over the country. The army took over the judiciary and administrative functions of government. Who do you suppose ordered it?"

"General Williams, I suppose."

"And who put him in the saddle? The Big Four. Now wait," she cautioned as Cameron opened his mouth. "I don't say the emergency didn't justify it. From all reports the country was in the worst mess in history. But the emergency passed, three hundred years or so later. But by that time there were only two classes, and the executives didn't want the government restored to the people. So they knocked off Jorg and split up into independent Centers. Not so independent, at that. Each has something the others need, so they got an armed truce. You got anything to say to all this?"

"Emergencies don't just pass," Cameron observed.

"You know what I mean," Gran said impatiently. "The country settled down, there wasn't any war. But the people had got used to being ordered around. First thing you knew they figured that was the way things ought to be. They accepted a rotten condition as natural. Thought they still had Democracy because they could elect a Congress that did nothing but criticize. Congress don't have any more to say about conditions than I have. Not as much, because I'm going to change 'em."

Cameron sat thinking of what she had told him, searching for a way to use her and the outlaws to his own advantage. She was quiet, also, looking

at the sea and the rising fog through which could now be seen far peaks on the mainland.

Somewhere inside the shack a tone sounded. Gran Duvain peered toward the path which led back to the outlaw capital, vented a short grunt and went to the elevator door.

"Company," she said. Then, with a look of diabolical amusement, "Guess you'll stay put. Yup," she chuckled, "you'll be there when I get back."

"Don't fall and break a leg," Cameron said with mock alarm. "I'd starve."

"You can always walk into the screen," she said lightly, and shot the elevator down.

One burning thought was in Cameron's mind: by one means or another, he must get back to Plastic Center and spread the warning. Pretending to join with the outlaws was not enough, for he would be merely another member of the band. He must offer some plan whereby the opportunity he sought would arise.

If he could take Pier Duvain captive— He smiled almost rapturously at the thought. He could name his price for the most wanted man in the nation. If he could also get hold of the mechanism which formed this death screen—

He made a careful scrutiny of the laboratory. He tried to remember what Gran Duvain had done when she made the screen. Her wrinkled old hands had moved among the maze of studs, dials, and buttons, but there were so many. That little plastic box atop the panel shelf looked sinister and efficient, but surely it could not generate enough power. You could hide it pretty effectively under a jacket.

The weapon was portable in some degree, he knew, for Pier's plane had one installed. Therein lay its greatest danger to civilization.

Cameron shuddered when he pictured the terrible destruction the outlaws could loose upon the Centers. Not only by the killing at will of any number they chose, but destruction of the entire cultural structure. By throwing this screen around each Center, they had only to sit back and name their terms. The Centers must capitulate eventually, or die, for they were not self-sufficient. Each needed some product of the others in order to maintain life.

There lay the weakest point of defense against such a weapon as this, Cameron reflected. All Centers were dependent upon Food Center, of course. But without commodities from Power, Plastic and Textile, Food could not operate efficiently enough even to feed its own citizens.

Yet, the outlaws seemed independent of any. Their buildings were not from Plastic, their roads not from Textile—and he didn't know about their food, though he hoped to soon. He was beginning to be hungry.

Did they manufacture their own necessities? This control room seemed to indicate it, for each article differed in varying degrees from its counterpart in civilized America.

It occurred to him with a slight shock that the outlaws were dependent, after all, to some extent upon Plastic Center. They had raided Plastic freight planes for years, taking their cargoes of Baltex. Why? Perhaps that was an attack point upon them.

He shook his head in exasperation. So much to know before he could form any plan of action.

The elevator's muted hum brought his attention back to his present circumstance. What was he going to tell Gran when she stepped back into this room? He felt certain that he must come to a decision—or appear to. Whatever he decided, he must sound sincere. The old lady was shrewd.

It wasn't Gran who stepped out of the elevator. The legs which extended from a flared tunic of executive purple were one of Nature's greatest artistic achievements.

Executive purple? Rescue? Cameron raised his eyes to the face and gasped as amused eyes, a slightly darker purple than the uniform, twinkled at him.

"You can't slug me this time," Ann Willis said. "Hello, Josh."

"Then you really are the spy," Cameron said. "Somehow, I didn't quite believe it till now. I'm sorry, incidentally, for hitting you."

She shrugged compact shoulders. "I didn't expect it. I should have. It was your only out. But I couldn't play any other role. I had to pretend until I was sure you were safe."

"Why didn't you just turn me in? Or, I mean, why wouldn't you? I would have in your place."

"Two reasons," she said as she sank into Gran's chair and lit a cigarette. "Somebody might listen to your story, even after you were arrested, because of what you'd been. Secondly, we were friends. I don't betray friends."

"How about Grueter, and all the citizens in Plastic?" Cameron's question was not quite a sneer but it cut.

She gave him an amused glance through the green veil. "I'm not betraying them. I'm solidly with Pier on the question of conquest without violence. That's why I'm here by the way. When you disappeared, Grueter started rooting around. You said you'd been discharged on false evidence, and when he examined the evidence he ran across your statement that it wasn't you who informed the outlaws. He's busy now examining those who knew of the shipment. It won't be long before he discovers it was I. So I lit out. We've got to act quickly."

Cameron considered this. He must act quickly then. But he needed information. A plan was

full formed in his mind, provided that certain conditions obtained.

"Ann," he said casually, "this screen isn't necessary."

She frowned doubtfully. "Gran said to keep it there till she got back. That may be hours, though. The High Council is going to decide on a plan of action and put it to a vote among the membership. That will take time."

"I won't try to escape," Cameron said easily. "I don't want to now."

She narrowed her eyes. She looked at him for several seconds. "Do you mean that?"

"Honestly."

"I believe you," she said. She went to the little box, touched a button and twisted a dial. The screen vanished.

In the process of adjustment she moved the box an inch or so, and Cameron's spirits surged. It was portable. It was small enough to steal.

He and the girl smiled at each other when she was seated again. Cameron was full of confidence. He saw the way clear.

"Gran gave me the true facts of history while she had me caged in here," he said. "It changed many of my views. But I'm not clear on a few points. You came along before she could answer my questions. Where do the outlaws get their power?"

"We make it, the same as Power Center. Gran stole the formula when she lit out with her son. We pirate a shipment of Baltex now and then and convert it into energy for our various camps."

"I see," Cameron said. "That clarifies several things. One more question. Do you manufacture your own products?"

Ann Willis' face glowed. "Gran did that, too. She figured out efficient manufacturing units. They had to be portable because the camps are nomadic. They're really wonderful. Our roads are easier on your feet than Textile's best. Our plastic is lighter and stronger than the Center's most expensive."

"Gran seems to be quite a gal."

"She made this contrascreen, too," Ann said, indicating the little box. "Don't ask me how. It taps our power beam and reorganizes the atomic structure of a tiny bit of Baltex. Then it projects a screen of energy which will destroy almost anything that touches it."

Cameron was ready. His questions were answered.

"Your council wants a sure plan of conquest, without violence?"

"Do you have an idea?" she asked eagerly.

"Listen," Cameron said.

He talked for nearly an hour, outlining each step in detail. She listened tensely, and gradually her face began to glow. When he had finished she was beaming.

"Josh! It's foolproof. Hurry! We must tell them!"

This is it, Cameron thought. This is the test. If they only believe me I'll be back in uniform within twelve hours.

She ran ahead into the elevator. As her back turned to him, Cameron scooped up the contrascreen box, slipped it under his shirt. He bulged a little, but he thought that they would be so busy with other things that it would escape notice.

They went almost at a run through the forest to the council chamber.

## VI.

When they had explained artificial crop culture to him, Cameron stood at his place on the rim of the council table and swept the dozen men and women with earnest dark eyes. He willed himself to think as an outlaw, to believe what he said while he said it. They wouldn't believe him if he didn't believe himself, and he had to convince them before he could achieve his ends.

"Your entire theory," he said, "is based on the proposition that a person accepts without question what he has learned to live by. All I have ever known is the culture of the Centers, and I have accepted it. But you, you say, see it objectively and find certain unacceptable factors. All right, I'll grant that for the time being."

He paused for what he felt was the right amount of time to gain their undivided attention.

"But I can look at your own situation equally objectively, and I find a certain blind idealism which cannot see weapons already at hand. Your problem of bloodless conquest is simple to me. The battle is economic in nature."

They stirred restlessly at this, but Cameron held up a hand. "Sure, you know that. You've just told me. But let me go through the project all the way to the end. That's been your trouble. You've run up against a wall before you reached the end. You've heard the first part of this a hundred times, but let me say it once more. All right?"

Gran, at the chairman's seat, nodded shortly.

Cameron boiled it down as much as he could. He merely stated that the first step was to break down the centralization of the culture. He did not go into detail, for they had explained the procedure to him shortly after he and Ann burst into the meeting.

He reviewed the details in his mind, however, as he mentioned it, and felt once more that they advocated sound logic. If Plastic Center had a power unit and manufacturing units plus the outlaws' secret of artificial crop culture, it would be completely self-supporting and independent of the other Centers.

Each Center could be divorced from the others and could be attacked one at a time and conquered

by the outlaw contrascreen. That was the simplest solution. But, Cameron reflected, thousands, perhaps millions, would die, and the outlaws did not want that.

"Very well," he said. "It's simple to break down the general culture and form subsidiary cultures. These will probably become armed camps, each bent on conquest of the remainder. That is, of course, if we stopped there. You have stopped there until now."

"Where else can we go?" Gran demanded. "How can we take over the governments and establish a system in which each citizen has an equal voice—without killing?"

"That," Cameron said—with a trace of smugness to make it natural—"is where you've overlooked your most obvious ally. Before I go into that, though, I'd like to ask something. You have your own power units, but you need Baltex? Right? You can't manufacture power otherwise?"

"Right."

"Then the first step in any negotiations must be a trade with Martin Grueter. The process of Baltex for power and manufacturing units. We must begin with Plastic Center before we can offer Textile and Food independence from Power Center. Right?"

"We know all that," Gran said impatiently.

"But you hadn't mentioned your need for Baltex," Cameron said. "I thought I'd get it clear in my own head. Now. We have the Centers operating independently, say. Our problem is to overthrow the dictatorships and substitute a democracy—without violence. Not without force, but without violence. Right?"

"Right!" Gran snapped. "Heaven's sake, sonny, quit stallin'."

"Have you ever considered the councils?" Cameron asked softly.

Blank silence. Brows furrowed, but nobody said anything.

"I can see you haven't," Cameron went on. "You've called them useless. You've said the dictators allowed them and the useless congress to remain so that the people would believe they had a democracy. They've been weapons of the dictators to keep down rebellion. They've been allowed to do nothing but criticize. But remember that power of criticism is powerful. Look what happened to me," he said with a rueful smile.

They still didn't see it, and Cameron felt an honest glow of accomplishment on his face. The hell of it is, he reflected, it'll work. I'd better keep the whip hand.

"What happens," he asked, "when the council lodges a criticism against the head of the military? I'll admit that's a rare event, but it has happened and can happen again. You know what happens. He is demoted to the status of ordinary

citizen, and his subordinate succeeds. Now listen."

They did. They were barely breathing.

"Somewhere along the line of officers we can get to one. Convert him if possible, otherwise bribe him. His men will obey without question. On The Day, he will imprison all executives who are not with us and we shall move in. We shall begin an immediate program of education—by example. All citizens shall be declared equal. Since the majority are inferiors of a minority, we'll have the mass support immediately. We'll have Luxury Center broadcast plays demonstrating the beauties of pure Democracy as compared to the present system. We'll make speeches. We'll hold elections. We'll establish a merit system of promotion."

"What happens," Pier Duvain asked, his dark face still skeptical, "if we have objections?"

Cameron pounced on this. He'd overlooked the point but the pressure of his arm against the little box suggested the obvious answer.

"Our first step, after taking over the government, is to demonstrate the contrascreen. After that there won't be any objections that can't be mediated. Now don't tell me that this is government by force, because it need not be. No government, however powerful, will ever need to use force if it administers for the greatest good of the greatest number. I understand that's our slogan."

"Shut up, all of you!" Gran snapped. "Of course he's right. Thought maybe he had some brains. We never thought of using the councils. All we got to do now is figure a way to make the criticisms stick. Got any suggestions, sonny?"

"That's simple," Cameron said. "Ann is your executive in Plastic. She can ask that certain criticisms be lodged."

"On what grounds?" Ann asked. "We didn't cover that."

"Let's see," Cameron pondered.

"I've got it!" Ann interrupted. "Look. We give the secret of Baltex to Textile Center, and accuse the commanding general of allowing it to be stolen. Inefficiency. Then, if we don't own his successor, we frame him in the same way. It's a temporary humiliation, and it's cheating, but they'll be restored to a political status equal to everyone else, so it won't matter."

"That just about wraps it up," Cameron said. "Now I—"

"Wait a minute," Pier Duvain put in. "I'll admit this sounds all right as far as we go. But what about the other Centers? We can't frame the military there in the same way."

"Don't have to, Pier," Gran said. "Didn't he say Luxury would broadcast plays? When those conditions are actually in force in Plastic, and other Centers can see on-the-spot proof of it,



what do you think the citizens will do? What would you do? You'd hightail it over to Plastic first time you could sneak through your Center's Shield. So they'll be forced to let us in, or become depopulated."

So, Cameron thought, the artist is functional after all. What a laugh!

"Well?" Gran said. "Are we with him?"

Their vote was hearty and unanimous. Not a single skeptical face remained in the circle. These faces were alight. They saw the end of a system they had fled, and the beginning of one they had conceived. Where no man should call another master, where all men ranked equally on the sociological scale. This was the end of their dream, the beginning of their task.

Cameron's emotions were somewhat mixed. Not that he had any intention of aiding in the overthrow of civilization as he knew it, but his ruse was so logical, so clear, and had so many qualities that were desirable that he was shaken to a certain degree. Not his faith. That was not shaken. But his belief was not as clear, as strong, as logical.

These outlaws were merely men and women who considered others as well as themselves. They were not brutal, they did not eat their young, they were not illiterate savages. These things he had been taught, had believed. These things were false. He did not ask himself if other "facts" as he knew them were also false. He did not want to ask himself that.

"May I make another suggestion?" he asked.

"Sonny," Gran chuckled. "You can do any darn thing you're a mind to."

"I think it would be sound psychology if I went to Grueter and offered him a power unit. I'd say I've been captured by outlaws and got away. I was chief of police, you know. If I turn up with a sure-fire formula for Plastic Center independence I'd probably get my job back and be doubly valuable."

"There's sense to that," Gran said. "What do you want, a plane?"

"No-o. I thought somebody could take me in. Pier, maybe."

They thought this over. Cameron cursed himself silently. He must not, must not make them suspicious.

"You see," he said glibly, "I'm not a pilot."

Their faces relaxed. "Surely," Pier Duvain said. "I'll take you."

"Under these conditions," Ann said, "I'll go back. There won't be any more spy hunt. And I'm necessary."

Cameron dared not object. He didn't want Ann in this for reasons not quite clear to him. He didn't know why; he only knew that he didn't want her involved. But he said nothing.

"I think I'll go, too," Harvey Willis said. "I'd like to watch the fireworks."

"I'll just go along, too, for the ride," Gran said. "Well, let's get a vote on this proposition." She spoke to a young man with a high forehead. "Shoot it to all the camps. Insist on an immediate vote. Let us know."

Cameron's jaw dropped. "You mean we may not go through with it?"

"Not if the people don't like it," Gran said. "What do you think a democracy is, anyway?"

Inside the long black plane, Cameron took a secluded chair aft on the excuse that he wanted to study the proposition to Grueter. Shielded by the seat in front, he examined the contrascreen box.

It's face was covered with clear directions and a large warning: **HANDLE WITH CARE!** He found the formula he wanted—how to form a dome one hundred yards in diameter and fifty feet high. The plane would fit comfortably inside that. He set the control dial at points indicated by the formula and slipped the box back into his shirt.

They were high in the dark night above the channel between the island and mainland, and Cameron could see nothing through the observation ports but stars and far lights on the shore which probably indicated Luxury Center.

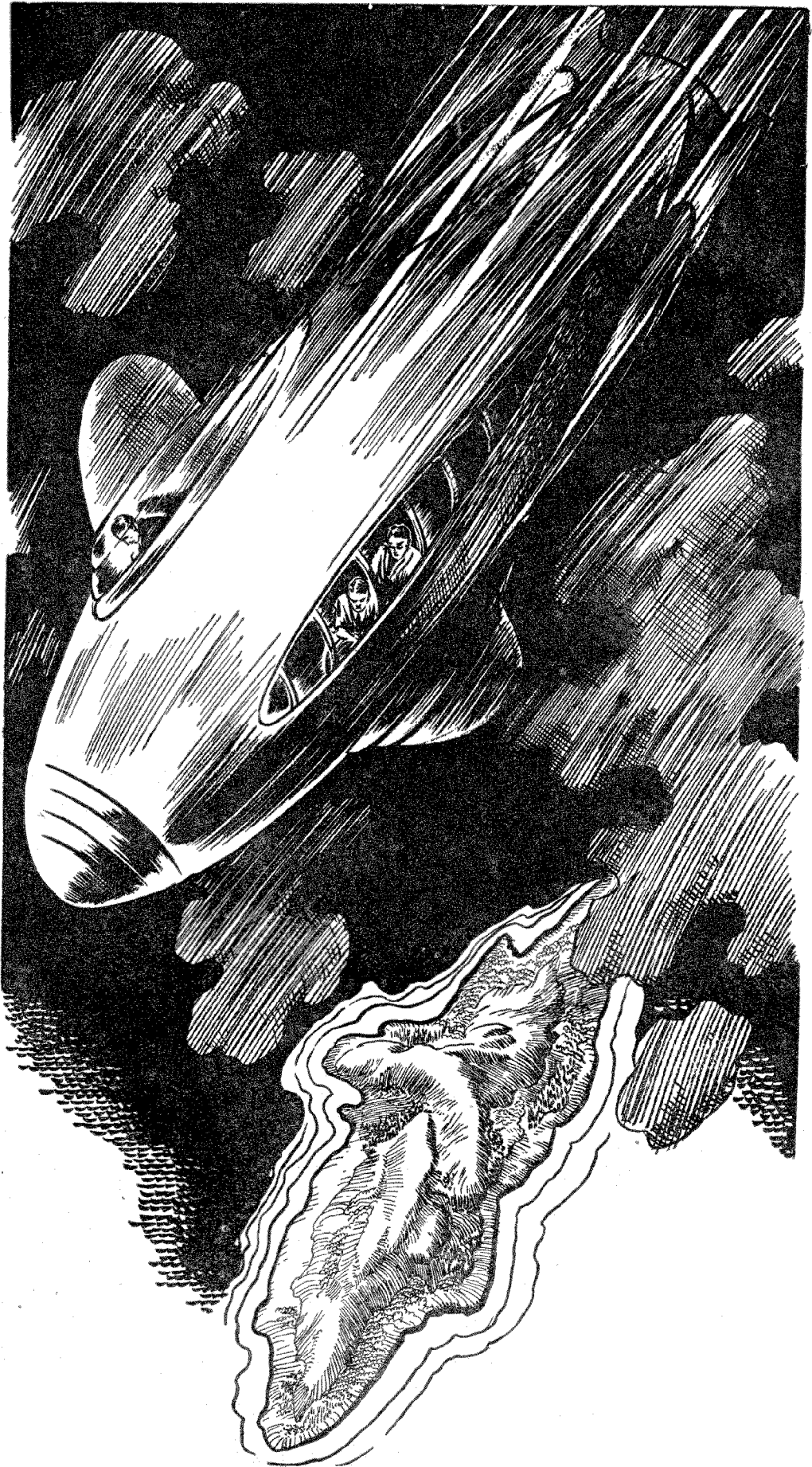
He was thankful that the vote had taken so little time, for Gran had not returned to her sentry shack after unanimous agreement of outlaw camps had been announced. Of course, she might have overlooked the absence of the box, but, on the other hand—

He strained eager eyes as the plane fled silently through the night. Plastic Prime was yet three hours away, and these began to drag. Some inner compulsion prevented his fraternizing with the outlaws, some uneasiness. He did not attempt to define this. When he became too uncomfortable, he caught Ann's eye and was made all the more uneasy, but pleasantly so, by the warmth that flooded him.

When the klystron announced Plastic's Shield ahead, Ann called out the collapse combination to Pier, and they were inside.

Now it begins, Cameron thought, and paced the floor in an anxiety which brought sweat to every inch of his body. It couldn't go wrong, of course. His plan was certain to succeed. Nevertheless, he heaved a great sigh when Pier dropped into a wide, deserted field at the edge of Plastic Prime.

Two tasks remained now inside the plane. To get through the good-byes without incident, and to convince Ann that she should remain aboard. If she insisted on accompanying him he'd have to slug her again. He didn't want to do that. He



was not even sure he could force himself to it.

She was tractable, however.

"You'd better let me find out if you're suspect," he said. "Then I'll let you know."

Her eyes deepened in color as she shook hands. "Thanks for the thought, Josh. I'll wait—for you."

"Good luck," they wished him, and he was off.

He paced one hundred fifty yards, turned, pressed the activator on the box and set it under a small bush out of sight. A tiny streak of flame circled around the plane as grass tops perished under the contrascreen.

Cameron hailed the plane and Pier Duvain answered.

"I've set a screen around you," Cameron said. "The dome. You'll be here when I get back, I think."

Pier came silently toward Cameron, a slim silhouette in the dark. He stopped ten yards away.

"What now, Cameron?"

"I'm going to turn you over to the authorities, Pier."

Duvain said nothing. The silence became painful.

"Did you think I'd stand by and see you destroy what we live by?" Cameron demanded. "This is my world you want to overturn. I can't let you do that."

Duvain said nothing.

"Naturally," Cameron said, "I feel bad about it on personal grounds. I like you and I think you're honest. But you're wrong, Pier. So I have no alternative."

The others had joined Pier. They said nothing.

"I'm sorry," Cameron said uncomfortably. "I'll make it as easy on you as possible. But you see, don't you, that I had no choice? It was no fault of mine that I was removed from a position in which I had a great deal of pride. Self-preservation, if nothing else, was a strong enough motive for my action. But in addition I was fighting for my world. My fight is as honest as yours, and has the added weight of majority approval."

Nobody answered him.

"You make me feel like a first-class son of an actor," Cameron said. "Pardon the profanity. But I'm acting according to my lights. No man can do more."

When the silence became unbearable, Cameron wheeled and marched away. Martin Grueter's home was not far, but it was too far for Cameron, for he didn't like the figures who accompanied him.

These were four, close packed in the dark, immobile, silent. Ann, Duvain, Harvey and Gran. They were with him, almost realities. Everywhere he looked he saw them, motionless, silently accusing him of treachery.

Ann. She didn't betray friends. She'd proved

it. He had been dangerous to the world she wanted, but she hadn't turned him in. She'd pretended to be unconscious, so that he could take her coagulator and a makeshift star. Friends.

Stop it! he commanded himself silently. You'll be turning back, first thing you know. You'll be an outlaw, equal under their code with all men. Their system would work, too, he reflected, but look what it would do to things as they are. Even an artist would have a vote in civic affairs.

He hurried, pushing these thoughts away, and presently stood on Grueter's identification plate. The door slid up, and Cameron entered.

Martin Grueter, big, square-faced, stood in the doorway to his bedroom and leveled a coagulator at Cameron.

"I am happy to see you," he said in level, sneering tones. "May I be of service?"

This, more than anything that happened later, shocked Cameron. During the few hours he spent with the outlaws, he had forgotten the formalities of the Centers. Suddenly he found them empty.

"I have Pier Duvain," he said abruptly. "He is my prisoner."

"Is that so important that you can dispense with ordinary politeness?" Grueter asked. "Where is he?"

"Not so fast," Cameron cautioned. "I want to make a trade."

"Where is he?"

"I want my job back," Cameron said, "and a few more things. Then I'll tell you where he is."

"Where—is—he?"

"Do you mean that you won't trade?"

For answer Grueter pressed a button on the wall beside him. Cameron became coldly angry.

"Calling in soldiers won't make me tell. For Heaven's sake, Martin, I'm doing this nation a great service. Surely you'll discuss it with me."

"Why should I dicker with you?" Grueter said shortly. "Give you back your job? You're not a desirable citizen. You're not even a desirable ordinary civilian. You refused to accept a judgment passed by your superiors. We don't want men like you in this nation."

"Then you'll never take Duvain."

"If he's inside Plastic Center, and he must be if he's a prisoner, we'll find him."

"Yes, you'll find him," Cameron said. "You can practically see him from here. Look!"

He pointed through the still-open door. The outlaw plane was barely visible as a blacker outline against the night.

"He's on there, captive."

Grueter's eyes narrowed thoughtfully. "You're telling the truth!" he exclaimed, almost in a whisper.

"On both counts, Martin."

A plane swooped down at the door and two

soldiers in red saluted Grueter. Cameron smiled wryly at Captain Robert Fane.

Fane went through an obsequious ritual of greeting which Grueter absently acknowledged. His eyes were on the plane.

"Guard this man. When I return you can dispose of him."

"Don't go out there!" Cameron said as Grueter moved toward the door. "Martin, it's death for you."

Grueter went out into the night.

## VII.

Cameron turned to Captain Fane. "Stop him, captain! He's going to his death."

Captain Fane's heavy, swart features showed amused indifference. He said nothing, but it was clear that he didn't care one way or the other about Martin Grueter.

Cameron shrugged. "I tried. You were witnesses."

He was not yet aware of what had happened within himself. But when the soldiers turned bored eyes to the doorway through which Grueter had vanished, Cameron had an opportunity to analyze his feelings.

He was an outlaw.

This was shocking, but there was pleasure in it. As the outlaws themselves walked with pride, he now felt equal with these soldiers who ranked next only to executives on the Center's social scale. He was an outlaw, as good as any man.

He had refused Martin Grueter's command, had thrown custom and caste aside, had rebelled in that one act against the culture in which he had been born and raised. At the moment of rebellion he had felt motivated by a desire to attain his former eminence. But he realized now that his motive had been deeper, embedded in a sense of independence which had grown to maturity among the outlaws.

The very scheme, he now realized, which he had proposed as a strategic maneuver against Duvain, had sprung from some basic part of his nature. He believed it. He had believed when he trapped the outlaws, but long conditioning prevented him from admitting it.

Yes, he was an outlaw now in spirit but not in fact. He was a captive. Further, and more serious, more heartbreaking, he was undoubtedly an outcast. After what he had done to Duvain and Gran, and Willis and Ann, they could have only contempt for him.

Ann. How would she look at him now? Not with deep lights in her purple eyes. On that occasion in Grueter's office, later in her own, her eyes had been hard, glazed. He shivered, remembering their coldness. And she had been act-

ing then. How would she look now when she meant it?

He twisted an ironic smile when he realized that he'd probably never know. Eventually, somebody would find that plastic box and turn off the screen. The outlaws would be helpless before the wave of attackers that would roll over them. And before that, perhaps, Josh Cameron himself would be a corpse.

At least he had a momentary satisfaction knowing that he was no longer subject to empty codes which made a great mass slaves of a few in purple. He had his moment, an independence denied most.

At that moment a faint call came through the door.

"Soldiers! Help!"

Captain Fane sighed. "Come on," he said to Cameron. "Don't try anything fancy."

Cameron marched between them across the field, dormant hope stirring faintly within him. Any informal action could create opportunity, and this, God knew, was informal.

The outlaw ship loomed larger as they approached, and Cameron could see the group silhouette of those four he was ashamed, but ached with desire, to face. Fifteen yards nearer stood Martin Grueter, who urged them with almost incoherent gibberish.

"Get 'em," he cried. "Give me your coagulator. Shoot the rats. Pier Duvain's there, the coward. Come on out, you. I'll show you!"

His voice was almost hysterical and contained a note which Cameron could not place. Fear? Anger? Insanity?

Grueter lunged toward them in the darkness and snatched the soldier's weapon from his belt. The big man whirled, pointed and pressed the activator. With what seemed to be maniacal fury, he flung the weapon at the group of silent outlaws. A small flash, a hushed *pop!*

"A fine soldier!" Grueter snarled. "Useless weapon! Give me yours, captain."

"What's the difficulty, sir?" Fane inquired, taking his coagulator from its holster.

"Idiocy. Contrascreeen, indeed! No such thing. Give—me—that—"

Fane presented the coagulator, butt first. Grueter snatched it, aimed, fired, and hurled it from him. He spoke with shaking, but controlled fury.

"Both of you men will be reduced to ordinary citizens for incompetency. Suppose you had to use those weapons. Capture those four!"

The soldiers started forward. Cameron took each by an arm. "Wait a second." They halted, surprised. "Why don't you go in there, Martin?"

The soldiers gasped at both the familiarity and at the sneer in Cameron's voice.

"They stopped me, begged me," Grueter said.



"Told me I would die. Nonsense! Attend to you later." To the soldiers: "Well?"

Cameron's hold tightened as the men surged forward. He yanked first one, then the other, to a stop. They faced him.

"Don't try it," Cameron said. "Let him go if he wants to. They saved his life, but I won't stop him if he isn't afraid. There's no need for you to die, though. You haven't done anything."

Captain Fane and his aid said nothing. Cameron could feel their uneasiness.

"Make Grueter do it," he pressed. "He's the one who wants 'em. Let him go in after 'em."

"Are you going to obey?" Grueter snapped. "Or would you rather be executed?"

They flinched, as if struck by a whip, and jerked free.

Cameron swung at Fane's jaw and the soldier's knees buckled. Without waiting to see the result of his blow, Cameron dived at the other soldier's legs, threw him sprawling.

Cameron's world spun as Grueter kicked him behind one ear. His arms went limp, but he rolled clear of the next kick and struggled to his feet. The soldier was up, too, and Cameron kicked him in the stomach. The man bent double as Captain Fane hit Cameron high on the head.

He hit the ground and bounced. He was groggy but able to rise. In a stumbling rush he leaped after Fane, dragged him down. When Grueter kicked him again, Cameron rolled to a point where he heard a faint crackle. Immediately, cries reached him.

"Josh! Be careful!"

"That was close, Cameron."

"Let 'em come, sonny. It'll teach 'em a lesson."

Cameron jumped away from the crackling. Maybe the contrascreen did sound like that where it met the earth. He didn't want to make sure. He jerked Fane clear, kicked him in the jaw with every last atom of strength and fell as the other soldier sped past him, intent on carrying out his master's order.

The flash, the explosion, brought silence.

"That's one down," Gran said, after a few seconds. "He'll know better after this."

Martin Grueter said softly, "What a weapon! A man could rule—"

His tone was shrill with fear, but his words were suddenly crisp. "What do you want for it, Cameron?"

"Shut up!" Cameron said contemptuously. "Haven't you any feeling?"

He helped Captain Fane to his feet. "Sorry about your buddy, captain. I tried."

Fane gripped Cameron's hand, spoke under his breath. "You can ask me anything . . . anything. I'll do it, I don't care why."

"I'll remember that, captain."

"Well?" Grueter broke in. "You came here

to make a trade. All right, I'll agree. But I'm not as interested in Duvain as I am in this screen. It may have a certain small value, and I am willing to discuss terms."

"Be quiet!" Cameron snarled. "I want to think."

"Do you realize who I am?" Grueter blustered.

"Yes," Cameron said wearily. "I didn't until now." He tried to discern the mottled look which he knew was flooding Grueter's square face. "So shut up."

Grueter gasped and Captain Fane shifted uneasily. But Cameron got his moment of quiet.

Presently he went to the little bush, picked up the plastic box and snapped the switch. He came back to Grueter.

"I'll dicker with you, Martin."

"Good!" Grueter enthused. "I like a man who makes quick decisions. We'll get along, Josh, old fellow."

"Get into that plane," Cameron said.

"Into—"

"The plane. Quick!"

"But—the screen."

"This is the screen. One false move and I turn it on you. You're safe, as long as you obey." He turned to Captain Fane. "Go back to your office, captain."

Fane saluted. "Yes, sir."

With Grueter walking cautiously, fearfully ahead, Cameron went toward the plane. When he reached the outlaws, he gave the box to Gran, whispered to Ann:

"You're a prisoner, too. March in there with him."

She obeyed without question.

"Miss Willis has already agreed to my proposal," Cameron said later when they were high in the darkness. "We captured her yesterday, but she finally agreed. She has the interests of Plastic Center at heart, it seems."

Ann took her cue. Her dark eyes were anxious. She twisted her long white hands as she hung on Grueter's reply.

"Independence," he mused. "It's desirable, but frankly, old man, I'd rather talk about that amazing weapon."

He turned avaricious eyes on it and Gran glared at him.

"You can't have it," Cameron said.

Grueter shrugged. "Ah, well. All right, I'll give you the Baltex formula for . . . let's see, what were they . . . power and manufacturing units. Yes," he mused, "we can soon bring the other Centers to terms." He twinkled jovially. "I don't suppose you jolly outlaws care about that?"

Pier Duvain set the robot controls and joined the group. He gave Grueter a dark, level stare, and said:

"You're not fooling us, Grueter. We know you'll set all the forces you command after us as soon as we drop you. You'll give us a phony formula and hope to catch us before we have a chance to try it. So we're keeping Miss Willis as hostage."

Cameron forced down the singing that rose within him. Not too well, for Gran shot him an amused look.

"Oh, I say!" Grueter protested. "She's one of the most valuable members of my staff."

"And," Pier Duvain went on, "we're throwing our contrascreen around Plastic Prime until we've had time to prove your formula bona fide."

"But that will maroon us, man! It will stop all traffic. We have contracts to fill."

"That's your problem."

Grueter was thoughtfully silent. Finally, "What else can I say?" he asked. "I'm forced to agree."

"Oh, no," Duvain contradicted. "You can refuse. We're not going to kill you. We'll deliver you safely and take our proposition to Power Center."

"Oh, my God, man! They'd soon rule the nation! They have enough Baltex ahead to last a year. No, I'll agree, all right."

They returned him, secured the formula and his promise to stop all traffic to and from Plastic Prime, and were soon headed for their island.

Cameron cut short the impromptu celebration. "Before I go into a personal matter here is something you don't know. Fane is grateful enough to lodge a criticism against Grueter for allowing the Baltex formula to get out of his hands. We can provide Fane with proof. Then Ann can take care of Fane's superiors until he's in command. Then we can move in. It shouldn't take long. Now, what are you going to do with me?"

His tone brought stares.

"When I went into Grueter's, I tried to sell you out."

A hardness came into their eyes. They had forgotten, in their triumph. He looked at them in turn. Pier's eyes were steady, not cold, not warm; Harvey's, red-rimmed, were aloof; Gran's were

blank; Ann's wide with—what? Sadness, anxiety?

Gran broke the silence. "What caused you to change?"

Cameron told them. "I believed, I suppose, all along," he added, "but wouldn't admit it. Anyway, there it is. I tried to betray you. Whatever you decide, I've got it coming, I guess."

"I suggest," Duvain said, "that we put you on probation for a suitable time, that we don't give you any authority until you've proved your sincerity. After all, even your about-face at Grueter's might be temporary, induced by anger and a desire to lash out at something which threatened you personally."

"He risked his life," Ann pointed out, "to save those soldiers. And almost lost it. That looks sincere."

"I agree with Pier," Gran said. "He ought to be watched. We'd better put a guard over him."

"Absolutely," Harvey Willis agreed. "We can't take a chance on his getting away."

Cameron felt humble. They were giving him another chance. He smiled at Ann. To the others: "Thank you."

"We'll keep him safe for you, honey," the old woman said to Ann, "till you can take over the job."

Cameron blinked, examined them. They were joking. He looked at Ann. She was suddenly scarlet.

"Should've heard her," Gran said to him. "Took on no end when you'd gone. Said you'd come through all right. Said she'd never—"

"Gran!" Ann cried. "Don't."

"Safe to tell him," Gran went on. "I can read signs. You're the only one for him." She turned to Cameron. "Said she'd never fall for a rat."

A strained but pleasant silence fell. Cameron knew he was looking fatuous. He attempted a grin at Ann. It felt all right, but he imagined that he looked as if he'd just been promoted. Ann didn't seem to mind.

"If your first one's a boy," Gran said slyly, "maybe he'll grow up to be president."

THE END.





# FOUR LITTLE SHIPS

By Murray Leinster

● An old favorite of science-fiction back again with an ingenious tale of little ships and special gadgets—ordinary sorts of gadgets—and a naval victory that didn't need battle-ships or planes or air carriers. Just—ingenuity and planning, plus four little ships.

Illustrated by Kramer

This is the story of four little ships in war time. They were the *Heron* and the *Tanager* and the *Gannet* and the *Thrush*. They were mine sweepers and, therefore, neither pretty to look at nor romantic to contemplate. They went down to Kaua from Pearl Harbor without escort of

planes, despite the enemy's long-range bombers and similar stratagems, and on the way they ran into a storm which was the Pacific at its most belligerent. For four days nobody on board got any sleep except holding on to something, and nobody got any rest at all. Then they reached

and found themselves in a beautiful predicament with all the rest of the American squadron. The predicament had developed swiftly.

As late as Monday, the 6th, affairs in the Kaua combat area had seemed nicely and comfortably balanced. There were three ancient American cruisers at Kaua, with four destroyers and a fuel tanker. Their function was the protection of American commerce in the southern Pacific, with especially watchful attention to the enemy base at Mahapa, which was exactly seventy miles as the crow flies from Kaua's observation point. On the same date the enemy was believed to have one fleet submarine and three destroyers—one of them pretty well battered—behind the mine fields and heavy guns of Mahapa.

On Tuesday, though, a battered native canoe capsized in the surf off Kaua's southernmost tip, and a native swam ashore to sob his hatred of the enemy's whole race, and to add that two monstrous enemy battleships had sneaked down under cover of the recent storm which had pretty well ended all commerce-raiding in these parts. That same afternoon a plane from one of the antique cruisers verified the information, and added that the newcomers were the *Michinoku* and the *Chuijo*—monster ships built in deep secrecy and flat violation of the Washington Agreement. They were rated at thirty-five thousand tons apiece and carried twelve sixteen-inch guns.

On Wednesday morning the four small and storm-battered mine sweepers—the *Heron*, the *Tanager*, the *Gannet* and the *Thrush*—limped into Kaua Harbor and discovered what they and the rest of the squadron were up against.

The enemy battleships, of course, were incomparably stronger than all the American ships together. The biggest American guns were the eight-inch batteries of the cruisers. And the Americans were not only outclassed in armament—they could be outrun. The destroyers might leave the superbattleships behind in a stern chase, but the cruisers hadn't a prayer. The purpose of the enemy movement was simply to pull the main American fleet out of Pearl Harbor for a game of hide-and-seek. He had a plan in mind which made it necessary. But pending the game's beginning, the squadron at Kaua was cold meat for the monsters and they could be expected to come over any day to dine. The Americans could surrender—which was not thinkable—or they could abandon Kaua and scatter in flight—which nobody considered—or they could wait for the enemy attack and then fight valorously with guns which could not range to the huge ships' side armor, nor penetrate it if they struck. Until the four little ships arrived the Kaua squadron seemed to have no other choice. Their coming changed the picture a little. Their armament, to be sure, consisted only of a six-pounder each and a few

antiaircraft machine guns, but in the American predicament anything would count. The four little ships counted a great deal.

Just before sunset on Wednesday the four mine sweepers steamed out of Kaua Harbor and headed west. Darkness fell swiftly behind them. They were less than ten miles on their way toward a mine field guarding Mahapa when droning, roaring things came plunging down out of the night to land in Kaua Harbor in their rear. There were not many planes. The navy had only so many with the range to reach Kaua from Pearl Harbor, and of that number they could spare only a few. But those planes came down and refueled. One hour after alighting they took off for combat service. The four mine sweepers heard them overhead on their way to Mahapa. They flew so high that the sound of their motors was a thin and peevish drone. The mine sweepers went on and the sound of the bombers dwindled and died. But presently there came faint flashes below the horizon, and once or twice dull sounds which might have been explosions.

The mine sweepers reached their appointed place, the long and ragged Challoner Bank. The Pacific Pilot said that the Challoner Bank was 15° 32' N. and 147° 50' East, extending nearly fifty miles in a northerly and southerly direction, sprinkled with reefs, and with a greatest depth between of not more than twenty fathoms. The Americans knew that where reefs didn't bar all passage the enemy had made it a mine field. It was a perfect first line of defense for Mahapa. Each mine sweeper broke out a sweep—a hundred and fifty fathoms of steel cable with a paravane at the end—and sturdily began to plow backward and forward in the darkness. Presently there was a monstrous, booming concussion. Then another. Mines.

Down below the horizon, momentary flashes looked somewhat like pale heat lightning. But it was air bombs—heavy ones. The mine sweepers paid no attention. They were busy. From time to time the heavy, booming sound of a detonating mine arose from the Challoner Bank. Then buzzings began overhead. A flare blossomed in the sky. The mine sweepers plowed on their way. The buzzings grew louder and became roars. Streaks of colored sparks darted up from one mine sweeper and then from another. Sharp, cracking detonations told of bombs dropped upon them as targets. They went on, firing their machine guns with complete futility. Then other buzzings came down from higher overhead and the bombing stopped, while the star-studded tropic sky filled with crazy sounds of roaring things in lunatic gyrations. Now and again there were tiny spittings in the sky, like miniature showers of shoot-



ing stars. Twice, flaming yellow objects fell insanely into the sea.

The mine sweepers methodically went on with their work. Now and again—not often—there came the heavy, shattering detonation of a mine. Toward dawn the noises in the sky diminished. When dawn actually came, the four little ships were heading back toward Kaua. Nothing of any importance seemed to have happened.

Nothing happened all day Thursday. The mine sweepers lay stolidly at anchor. The American squadron lay still in Kaua Harbor, baking somnolently in a glaring, white-hot sun. The palms on the island let their fronds droop discouragedly. The surf boomed languidly on the beaches. The only activity anywhere was the planes, which buzzed continually above the island. Now and again one of them darted away toward Mahapa, and now and again another came back. But there was no gunfire of any sort. The enemy did not appear to attack Kaua. Nobody knew why. The Americans did not move to attack Kaua. Everybody knew the reason for that. Nothing happened anywhere, but a battle was definitely in prospect.

The enemy was sure of it because the four little ships had swept channels leading through the mine field on Challoner Bank. It did not make sense, of course. The American ships were out-classed in guns, armor, speed, and size by the *Michinoku* and *Chuijo*. But the mine sweepers would not have swept and buoyed two channels through the mine field save for the purpose of attack. It could not succeed, of course. The Americans could not even flee with any real hope of escape. It looked as if the squadron at Kaua, knowing itself doomed, planned to go down in a daring, desperate assault upon the enemy, in which the three ancient cruisers would throw themselves away to try to get a chance for a torpedo attack on the big ships. The enemy could not quite believe in such an intention, but all other explanations were improbable, too.

The four little ships lay at anchor all day Thursday. Toward sunset they steamed out once more and again went wallowing through the long smooth swells to westward. They were heavily built and solid small craft with the engines of powerful tugs and the stolid, purposeful appearance of so many scrub women. They neared the Challoner Bank and small enemy surface craft ran away. They certainly did not run from the mine sweepers out of fear. None of them mounted anything bigger than a six-pounder. But they ran away, nevertheless, in the newly fallen night.

The four small ships' searchlights flashed briefly. They found the buoys they had planted the night before, marking two clear channels through the mine field. The four mine sweepers methodically smashed those buoys. Because, of

course, the buoys had been cut loose from their original moorings by the enemy small craft, and humorously reanchored where there was no channel at all. The mine sweepers then painstakingly swept again through the channels they had cleared the night before. And at irregular intervals during the next half-hour there were monstrous, booming detonations.

They went painstakingly about their business. They were fitted with various devices for their work besides the sweeps. One device had been developed from the electrical contrivances by which public-service companies locate buried gas and water mains. It was an induction finder, and instead of finding water pipes it made chirping noises when a sweep passed over a mine. Another was a variation of the road signs which warn motorists of curves on a highway at night. Yet another had originally been used in prospecting for petroleum, and a fourth was practically nothing but a glorified automobile horn, operating under water. None of them was glamorous.

For a long, long while they moved back and forth upon the Challoner Bank which the enemy had so carefully strewn with mines. There was not a single explosion more. Nothing happened. Nothing happened at all.

But then, out of the darkness, black shapes came boring swiftly from Kaua. They were the American ships, sooted to near-invisibility in the night by submergence in smoke clouds especially generated for the purpose. The mine sweepers did not halt in their task. The American squadron moved very swiftly and very quietly through the channels the mine sweepers had made. It went beyond the mine field and turned sharply north to approach Mahapa from the least probable direction.

The four little ships kept on with their work. They moved with a fair speed, strung out in echelon; the *Heron*, the *Tanager*, the *Gannet* and the *Thrush* in line oblique, each towing a long sweep cable at an angle over its side. These sweeps, however, were not deeply sunk. They trailed barely below the surface and they were lighter and thinner than a sweep designed actually to uproot mines from the ocean floor. The four little ships gained knots in speed by the substitution. And the device which had originally been used to locate buried gas and water pipes now functioned busily. Loud-speakers chirped alertly in notes of diverse pitch, telling of the location of mines. And little catapults on the sterns of the mine sweepers came into play, flinging slender rods with bulbous excrescences at their ends for different distances out over the water.

The rods had developed from the road signs that mark curves on highways. Each was a slender pole which would float upright in the water. The

bulbous thing was an anchor with a length of fine line. When a chirping sound located a mine, a harmless missile splashed into the water above it, and its anchor twisted down, while the pole floated with nearly eight feet of its length out of water. It was undetectable in the darkness unless one knew. The trick of it was the road sign. The tip of each rod contained four cat's-eye mirrors, lightless and normally unseen. Yet a winking light sent across the waters would be reflected with uncanny accuracy back to its point of origin, in so narrow a beam that one had to use a combined light and binoculars to find it. And the reflected beam was colored red. It could not be confused with a wave reflection.

For almost an hour after the fleet's passage the mine sweepers went about their work undisturbed. Then planes went by overhead. They came from Kaua. Only minutes later there were again the distant flashes—below the horizon line—of monster explosions at Mahapa.

At Mahapa there was battle and carnage and sudden death. Planes grappled furiously ten thousand feet above the earth. One American destroyer flung itself into a desperate plunge across the harbor mouth, shedding floating mines in a steady stream astern, and flinging them crazily in intricate patterns from its depth-charge catapults. Floating mines are unanchored, free-floating, deadly things, kept at set depth by tiny motors. For a certain minimum time—until the current carries them away—they make any area in which they are sown unnavigable. The cruisers lobbed their eight-inch shells over the outer rim of land into the inner harbor. Three torpedo planes flashed down and were illuminated starkly by the flare of a monstrous explosion, and one of them went to pieces as an antiaircraft shell hit it squarely. Bombs dropped and searchlights probed fiercely upward, and the heavy guns of the shore forts opened a furious fire while the destroyers laid thick and opaque smoke screens to shield the cruisers, and flung their own four and six-inch shells into the harbor, too.

It was not suicide by the American squadron. It was a raid. But the result should be the same. The *Michinoku* and the *Chuijo* were colossi. Given destroyer protection against torpedoes, they should be invulnerable. When they came out—

Parachute flares flared bleakly in the sky. The crazily racing American destroyer, sowing floating mines to cover the dash-away of the American fleet, vanished in a monstrous heap of spouting spray and flaming gases. When the smother subsided the destroyer could be seen with its after-part gone to the water's edge, trying to drag itself away from the scene of disaster like a partially crushed insect.

It was time for the raid to end. The American ships shed more clusters of floating mines to deter

pursuit, and moved swiftly away in the blackness. Smoke swirled behind them. They vanished, only the flashes of their guns firing sternward testifying that they continued to exist.

There was only air combat above Mahapa. Zooming, booming planes still careened madly through the night beneath the stars. Bombing ceased while the American planes tried to keep all enemy planes too busy to track down the fleeing squadron. But scout planes quested the sea regardless, and the Americans devoted themselves to savage attacks, and dogfights took place miles out at sea in every direction.

Inside the harbor, the *Michinoku* and the *Chuijo* chafed. Their own mine sweepers went out to see what could be done about clearing the harbor entrance. One of them, barely out of the narrows, rose skyward in dissolving fragments atop a two-hundred-foot column of spume. But the others went on gingerly. The ocean current past Mahapa would take care of the floating mines in time. But time was precious. If the monster battleships could take up the chase before too long, they could overtake the ancient American cruisers long before they could win back to Kaua. And if they overtook them they would annihilate the lesser ships.

They came out—and the cruisers had been located. Their fiery, phosphorescent wakes had been sighted by a scout plane which relayed the information before two American fighters shot it down. The *Michinoku* and the *Chuijo* headed for their prey. They were huge. They were monstrous. They were stripped and streamlined and terrible. They hurled themselves through the water at thirty-five knots to wipe out the squadron which had dared to beard them in their lair. The whole ocean seemed to throb with the power of their rush to kill.

On the Challoner Bank the four little ships steamed soberly about their business. They swept across the width of the mine field, and loud-speakers made chirping, or clucking, or thumping noises, and slender rods went arcing through dark air to splash phosphorescently when they touched the water. And presently an almost-invisible stick floated close by an anchored mine and supported little mirrors—developed for road signs—which reflected only darkness.

Once, and only once—it was their sole active contribution to the actual fighting—the little ships broke their routing. That was when a little blue light glowed on the *Heron*, and a special sounder made a moaning, keening noise. A quick signal passed among the four little ships. The moaning noise spoke of the presence of a mass of steel too huge to be a mere mine casing. It could only be the enemy's one fleet submarine, patrolling dark waters because of its commander's thirst for glory.

It had heard the engines of the mine sweepers and it drew near to fire torpedoes at the sound.

The four little ships simultaneously made noises under water. They used their submarine sounders, adapted from the design of automobile horns. Those sounders were made to detonate acoustic mines, which are planned to be exploded by the noise of ships' engines. But acoustic mines are now so designed that a sudden sound, too loud, makes them insensitive.

The four ships made a raucous racket underneath the waves. A confused, a wailing, a tumultuous racket in which each ship varied pitch and volume in such a bedlam of sound that the nearby fishes fled dizzily from the spot. But the submarine—which saw through its ears—was bewildered by the blast of noise. Its delicate microphones were jammed and blasted. It essayed to move silently away from the uproar which made its instruments read sheer gibberish. But the speed of even a fleet sub is limited when submerged. The four little ships could more than match it, and they were not using any listening device. They had detected it and they now broke echelon and closed in on it because of the effect of its metal mass upon instruments originally planned to locate gas mains.

Presently there were explosions under water. Depth bombs, which heaved up monstrous masses of sea and pitched the four mine sweepers crazily about. But the keening, moaning noise of the submarine in the submarine inductance indicator went down and down and down in pitch. The submarine was sinking lower—and the Challoner Bank gives abruptly upon deep water. When the sub was at least four hundred fathoms down the four little ships arranged themselves in echelon again and went back to their methodical criss-crossing of the Challoner Bank. They knew the sub would not come up again because four hundred fathoms is over two thousand feet.

The long swells came monotonously from the southeast. The mine sweepers kept on with their equally monotonous task. They did not even swerve from their courses when out of the darkness there came the flashes of gunfire. Not even when they saw the terrible flares which denote the firing of sixteen-inch guns.

The sooted ships of the American squadron came hurtling out of the darkness and plunged into the mine field. From the bow of each ship came flickering, none-too-vivid winkings of light. From time to time small guns coughed rackingly over their bows. The guns were small ones—four-pounders at most. Each shot was followed by a detonation which sounded like about a pound of high explosive going off under water. Which was exactly what it was.

The American fleet restricted itself to those

wide lanes the mine sweepers had marked with their slender rods and cat's-eye mirrors. And it moved in safety through the mine field—even bumping iron cases loaded with annihilation—by the simple process of firing tiny depth charges before it. Because every mine is protected against a chain explosion by a device which desensitizes it when a concussion wave strikes, the cat's-eye-mirrored buoys made it practical for each ship to neutralize any mine it approached by firing a depth shell to operate that mechanism. But the mines returned to live and deadly state within two minutes.

The mine sweepers did not join the fleet in flight. They stayed on at their task. Aircraft joined battle overhead. Parachute flares sprayed pitiless light upon the water. Far, far away, two monstrous detonations sounded, and the American squadron turned as if at bay, and its guns opened up again in the seeming of futile and pitiful defiance. They gave the exact appearance of ships which had been cornered and driven into the mine field on the Challoner Bank, and which had discovered the fact when the mines took toll.

The enemy fleet raged forward magnificent. Finer navigation, perhaps, would have warned its crews, but Pacific currents are varied and swift, and a racial inferiority complex does not lead to discretion in a moment of overwhelming triumph. It appeared that the American squadron had essayed a raid; had been cornered in its flight; and that it now stood pitifully at bay with a mine field behind it and the overwhelming might of two superbattleships coming up to batter it to scrap iron.

The huge guns of the *Michinoku* and the *Chuijo* fell scornfully silent. They swept on at thirty-five knots in the obvious, wrathful determination to finish this action by direct fire. American flares lighted them as their own flares played upon the American ships. Shell spouts rose near them. American shells, fired in seeming hopelessness. But—

A destroyer, racing a bare hundred yards from the *Michinoku*, buckled suddenly and its bow dived under water while its afterpart reared upward on a mountain of water sprouting below it. Something struck the *Chuijo* an incredible blow. It reeled and swung in a wide arc out of position, and almost overran one of its own destroyers. The destroyer flung over its helm in panic, and its whole stern vanished in a sheet of lurid flame. Another destroyer to starboard hit something and its torpedoes went off in a series of winking flashes which seemed to rock the Universe. Then the *Michinoku* struck.

The chase ended at that instant. The two superbattleships did not go down at once. But they were crippled and they were trapped. Their skip-pers must have thought at first that they had run

into a floating mine field of the Americans' sowing. But then their depth finders told them the truth. They were among their own mines on the Chal-loner Bank, and to all intents and purposes they were doomed.

The *Michinoku* threw her engines into full speed astern and the *Chuijo* did the same. If they could stop and anchor, and if sweeps could be improvised quickly enough, they might yet live until trawlers from Mahapa could clear a way out of this for them. Even anchored and unmaneuverable they would be a match for ten times the American force.

But even that humiliating resource was denied them. American planes came diving in. Smoke screens had to be made for protection against torpedo attack—and two destroyers died while making them, upon mines compatriots had laid. The *Chuijo*, its steerageway almost gone, hastily dropped an anchor and it scraped a bottom-anchored mine which blew away the anchor and twenty feet of the *Chuijo's* bow.

And the American ships came back. They could have gone quietly back to Kaua with the superbattleships out of action for weeks or months to come. But they came back. Sooted and stern and savagely battered, they returned for the kill. They still were far outmatched. Their antiaircraft guns were busy, and their own aircraft fought savagely above them, but they came in. The air about the big ships was murky, almost opaque. Ragged streamers of oily vapor covered the sea in inextricable confusion for a space of miles. Into that crisscross of obscurity the ships from Kaua plunged once more. They moved by dashes and darts and turnings, following the crisscross lanes in which all mines were marked by buoys the enemy could not see. To the enemy, their courses were unpredictable. One of the cruisers sank an enemy destroyer at six hundred yards, coming upon it out of suffocating smoke. Point-blank fire from eight-inch guns shattered the destroyer before a torpedo tube could be aimed.

The *Michinoku* overrode her anchors and tripped upon a second mine, and then an American

destroyer came out of nowhere and startledly let go two torpedoes and got away without a shot fired at her, and the *Chuijo* drifted helplessly upon a nest of mines which let go one after another—

Two enemy destroyers got back to Mahapa out of all the enemy fleet, and neither of them was in shape to offer battle for a long while to come. When dawn broke the American cruisers were picking up life rafts to which hordes of sodden figures clung hopelessly. The fighting tops of the *Michinoku* still stood above the water. She had sunk in fifteen fathoms and very nearly on an even keel. A group of officers fought with small arms from those utterly untenable positions until an American destroyer opened up a machine gun. They had tried to destroy or dismount certain range-finding devices in the fighting tops, and failing to do so had died to protect their nation's secrets. The Americans, examining the mechanisms, found them inferior and did not trouble to salvage them. Then the American fleet steamed back to Kaua, leaving the four mine sweepers to pick up the hundreds of floating sticks they had strewn the night before, and to clean up the mess generally.

It was a great victory. American newspapers published pæans of triumph under hundred-and-twenty-point heads, and the crews of the ancient cruisers and the surviving destroyers were heroes and would be famous for years to come. Even the air force came in for its share of praise. Two superbattleships and a destroyer escort wiped out by an American squadron of one third the tonnage and one twentieth the gun power.

But the four little ships: the *Heron* and the *Tanager* and the *Gannet* and the *Thrush*—well, it was not expedient to praise them too highly. After all, the enemy still didn't know what had happened. To reveal too much of the mine sweepers' share would be to give the enemy valuable information. The devices that had won the victory were strictly hush-hush. So the official accounts did not mention them.

Two weeks after the battle the four little ships were ordered back to Pearl Harbor.

THE END.

NO FINER DRINK.





# IN TIMES TO COME

Since the army and navy—particularly the navy—started taking science-fiction authors wholesale, I've been working at the never-too-easy job of finding new writers. Those of our friends who have gone in have, in every case, volunteered; usually they have gone in as specialists with special training, since science-fiction authors almost always have a good bit of scientific background which, in today's scientific war, is extremely valuable to the country. Hubbard has been an adventurer all his life; he had special training of an even more directly applicable nature—he's been a fighting man and a skipper of his own ship before.

Since the beginning of the year, three new authors of real major promise have been developed: Padgett, Will Stewart and Hal Clement. Well, Hal Clement's studying Japanese so that, when he gets the appointment he's applied for, he can be sure he gets the Japs he wants to settle with. Padgett's clearing up some work before he gets things straightened around for going in. And Stewart's studying up on cloud formations with an eye cocked for the army air corps.

So far, I'm stymied, myself. But I'm running an unofficial recruiting office. I know a place where some young engineers, with engineering degrees and a little experience, a degree at least, are very badly needed. The work being done is, most naturally, decidedly secret. It's also some of the most fascinating work a trained technician, with the wide-open mind science-fiction needs, could possibly get into. It's a chance to really serve the country in a way that will make your training, and particularly your trained imagination—something even rarer than engineering training—count for a maximum result.

How come science-fiction trained imagination could be a factor in a United Nations victory? Well one angle I can suggest is the development—practical, workable development of a nonfictional—spacesuit. The press, the aviation magazines like *Air Trails*, have been recounting constantly the aircraft attacks at higher and ever higher altitudes—an unending battle for combat supremacy through altitude supremacy. The difference between interplanetary space and the topmost fringes of Earth's atmosphere is undetectable to a living being; both are one hundred percent fatal—without a spacesuit. It stands to reason that our military agencies are going to examine with care—for direct and vital application—any ideas you engineeringly trained imaginative men may send in with reference to the problem of low-pressure high-altitude—space!—suits.

That's one angle of science-fiction-come-true, one way in which science-fiction trained imaginations can be useful.

Men with degrees of any kind in engineering or science, aeronautical, mechanical, electrical, physics—particularly electronics—chemical, plastics, any and all of the physical sciences are needed. There's a need, too, for a few who have had two to three years of college engineering training. Men with training—and imagination.

And, personally, I can't think of a surer way to find such men—with the added qualification of an imagination that isn't frozen out in four years or more of textbooking—than through these pages.

Unofficial, naturally—but I'll guarantee to see that your letters reach official channels. This is not a stunt, and I'm not trying to sell magazines in this; I mean it very sincerely.

The Editor.

## THE ANALYTICAL LABORATORY

The two laboratories below are the proper current one—that covering the September issue—and the one that should have appeared in the August issue, concerning the June stories. It got left out of the August issue by a combination of things. My apologies, and here it is:

Analytical Laboratory on June, 1942, Astounding:

Place	Story	Author	Points
1.	Bridle and Saddle	Isaac Asimov	1.55
2.	Proof	Hal Clement	3.40
3.	Heritage	Robert Abernathy	3.7
4.	On Pain of Death	Robert Williams	3.8
5.	My Name Is Legion	Lester del Rey	4.0

There were eight stories in the June issue, so

votes for places ran from 1 point to 8 points. Hence the big jump from 1.55 to 3.40.

Analytical Laboratory on September, 1942, Astounding:

Place	Story	Author	Points
1.	Nerves	Lester del Rey	1.00
2.	The Barrier	Anthony Boucher	1.81
3.	The Twonky	Lewis Padgett	3.5
4.	With Flaming Swords	Cleve Cartmill	3.8
5.	Pride	Malcolm Jameson	3.9

And on that score sheet, you see the remarkable phenomenon of one hundred percent of the voters voting one story, "Nerves," into first place, or tying it with "Barrier."

The Editor.

# MINUS SIGN

By Will Stewart



● They sought a chance to study minus matter—contraterrene stuff that was the electrical inverse of normal matter. But the planetoid they visited was more strange even than that!

(Illustrated by Kolliker

## I.

Pallas didn't turn on Mandate time. This five o'clock, it was midnight over Pallasport. Rick Drake strode down the curving street of glaring fluorescent signs and gaudy glass-and-metal fronts with the black sky reflected on his face.

"Hi, engineer!"

Karen Hood called her eager greeting from the corner where she had been waiting for him in front of the huge, magnificent Interplanet Building. In sheer black dress-pajamas, Karen was a red-haired cataclysm. Now he thought her warm, husky voice sounded a little too deliberately light and gay.

"Hello, Kay." A lean, space-bronzed giant, he towered over her slim tallness. The way her tawny hair struck back a sign's red-changing glow somehow made a sharp little pain in his throat. In a low, careful voice, he said, "On the phone you just said you wanted to see me after work. What's up?"

"I'm taking you to dinner"—she slipped a bare white arm through his and her high-cheeked face, smiling, took his breath—"because I've something to tell you. No, I insist on paying the bill, this time, because I think you won't like what I have to say. Shall we go to the Mandate House?"

She saw the protest on his spare, space-bronzed face. The Mandate House was the exclusive,

expensive haunt of the High Space Mandate politicians and the high-priced executives of Interplanet and the other corporations, and Rick Drake no longer felt at home there. Karen didn't give him time to object.

"Make it the Beacon Lunch," she amended quickly. "Please, let's don't quarrel."

The sign of the Beacon Lunch was the big iron wheel of a meteor-drift marker, mirrors flashing as it spun unceasingly. The colored warning flicker made Rick think of his father, the stooped and shrunk elder giant. His big shoulders lifted for a moment, triumphantly, as he remembered how old Seetee Drake had moved Freedonia. Then, trying to cover the trouble she gave him, he smiled at the red-haired girl.

"I couldn't quarrel with you, Kay. What's the bad news?"

"Wait till we've eaten." Her soft voice was dimly apprehensive. "This is serious, Rick."

He followed her to a booth in the rear of the long, bare eating place. A card on the cheap nickel table invited: TRY OUR SEETEE SPECIAL—THE KICK OF A CONTRATERRENE METEOR! He picked it up with a wry brown grin. The kicking agent, he knew from experience, was some 30cc. of synthetic alcohol. That wouldn't help matters with Karen. His face turned moody, and she asked softly:

"What hit you, Rick?"

He crushed the little card, slowly, with tanned powerful fingers. "It makes me think of too many things." His blue eyes looked up at her, wistful and unhappy. "Of all the difference between us."

Then the amiable, beaming Venusian-Cantonese waiter brought the menu. They ordered the Blue Plate. Rick sat staring gloomily at Karen's fair, vivid face, now puzzled and grave. Suddenly she seemed out of place in this plain, noisy room, with the smell of cooking and the stevedores eating at the counter. With a rush of feeling, he blurted:

"I'm sorry, Kay. You don't belong in a joint like this, and I shouldn't have let you come." He gulped, half incoherent. "I mean, you're too—exquisite. You belong at the Mandate House, or back in a roof garden at Panama City. You're too . . . too fine for life on this frontier."

He leaned over the little metal table. His big bronze hand fumbled awkwardly with a water glass, trembling so he spilled a little of it. His stumbling voice was low and earnest.

"That's all the trouble—it's no use pretending. I was born on a pebble-size planet, millions of kilometers from the nearest doctor. I'm just a native asterite—even if I have learned spatial engineering and got to be acting director of the Interplanet lab. But you were born with an Interplanet coupon in your mouth."

"Stop it!" Karen's nostrils widened and the white skin of her high-cheeked face was turning

pink and her blue eyes were dilating. He saw that his words had changed her puzzlement to a sharp resentment.

"You're unfair," she protested softly. "I know you were born on little Obania, but your mother came from a wealthy Interplanet family and she sent you back to Panama City for your education. And you know that I work for a living."

"I know." His grin was gently ironic. "You're secretary to Max Vickers, at fifteen hundred a month plus bonus. Oh, maybe you earn it—but don't forget you got the job by being the niece of Chief Commissioner Hood."

"I'm counting ten." Her throaty voice was restrained, not really angry. "You're jumping to conclusions—and I'm really a very efficient secretary. I'm almost the acting branch manager. And I'm not out here just because I happened to be born in the High Space Mandate. I like it."

Now her flashing eyes were almost black. Rick thought that her mounting wrath was very becoming, but he decided not to mention it. She gulped, with an entrancing pulsation of her fine throat.

"I could have stayed in Panama City," she went on warmly. "I had money—and plenty of chances to marry more, thank you. But I don't like pent-houses and roof gardens. I didn't want to be the toy of some playboy planetaire. If you think this frontier is too rough for women—well, you just don't know what you're talking about. Really, women have a lot higher position out here. I've worked hard to make a place for myself in the Mandate, and earn my own way. I like it. And please don't sneer about my uncle—even if he did get me the job."

"I see—and please forgive me," Rick said contritely. "Is that what you wanted to tell me?"

"No, that's something more important." The flash of anger had cooled, and her triangular face was almost anxious. "I'll tell you after dinner—and I didn't mean to quarrel, really."

The grinning Venusian brought the Blue Plates. Rick noticed they were three dollars each, with coffee fifty cents extra. He couldn't help thinking that the whole meal wouldn't cost fifty cents, back in Panama City. The way the commissioners kept the asterites dependent on expensive food imports was just another example of the selfish Mandate politics. But he didn't say anything. He didn't want to quarrel. At last, when they were sipping the coffee, Karen began very quietly:

"I think you've been rather unwise, Rick. It seems you still don't know very much about practical politics. But you really should have learned to be careful on the photophone."

"Eh?" He gulped, and tried not to show the little pang of fear that stabbed him. Karen was leaning urgently over the table. Liquid fire flowed distractingly in her hair, and it was hard to re-

member that she belonged to a different world.

"I've seen a transcription of your photophone conversation with your father, this morning," she explained gravely. "I know how he moved the asteroid Freedonia, with a contraterrene meteor for fuel and the empty terraforming shaft for a sort of rocket gun."

Rick put in eagerly, "And that was quite a feat!"

"It was," she agreed without enthusiasm. "It took a great deal of cleverness and skill and courage. Your father succeeded in blasting the unclaimed asteroid off its collision orbit, and consequently the Mandate has to grant him title to it. But still it wasn't wise, Rick—any more than your photophone talk about it." Red lights danced as she shook her head gravely. "Contraterrene matter is dangerous to handle—in more ways than one."

Of course he knew seetee was dangerous. It was matter inside-out, with orbital positrons instead of orbital electrons, and when it touched normal matter the result was spectacular atomic annihilation. Spacemen called it hell in chunks, but his father's old and mighty dream had been to tame it to serve the needs of men. Danger hadn't mattered.

Stubbornly, Rick protested, "I don't know what you mean."

Her fine white shoulders tossed impatiently.

"Don't be silly, Rick. Anybody could see through your reference to a metallurgy lab. It was pretty clear that your father and his partner want that rock for a contraterrene laboratory. And you even spoke of leaving Interplanet, when your contract expires next month, to help them build it." Her voice fell, husky and urgent. "Please, Rick—you won't think of that?"

Rick sipped his coffee, confused and unhappy. He heard his father's voice again as it had come this morning over the thin light-thread of the photophone from far-off little Obania.

"Think it over, Rick." For all his splendid triumph, in moving the rock, the mighty elder giant had seemed gruff and choked with feeling. "Better keep your job and save your pay and watch your tongue. I've been drawing up some estimates on what we'll need for that metallurgy lab, and they run to something like four million dollars. Rob McGee will be coming to Pallasport and you can talk to him. But there's nothing much that we can do without a lot of money."

Rick had thought their talk sounded innocent enough. But evidently an Interplanet agent had been listening in, and Karen understood. Her eyes were dark and anxious now, and her low voice begged:

"Rick, you *couldn't*! And you must get them to drop it. Once I met your father and his partner, you know." She smiled faintly. "When we first came out from Earth, and they came here to

Pallasport in that quaint little tug. I like your father. He's so strong and sure, so really great. And his partner, too . . . what's his name . . . the ugly, funny little man who always knew the time without looking at a watch?"

"Rob McGee," Rick told her softly, thinking of that odd little spaceman.

"I like them both," Karen said earnestly. "They're the real pioneers of space. I don't want anything to happen to them, Rick—or to you. Can't you persuade them to let seetee alone?"

Rick couldn't meet her dark, pleading eyes. He wanted to tell her about his father's old, splendid dream, but he knew she wouldn't understand. It wasn't any use to talk, because he knew they would only quarrel—and he felt he couldn't stand to quarrel with her. He managed a brown, cheerful grin.

"I'll think about it," he promised. "But let's forget it, for tonight. After all, Red, my contract doesn't expire till March 24th—and there's dancing tonight at the Silver Moon."

"Smile when you call me Red!" Karen challenged gayly, equally anxious not to quarrel.

Rick let her pay for the Blue Plates because of her red-haired resolution, and then they danced at the Silver Moon. She was light in his arms and beautiful, and he forgot his objection to the Mandate House long enough to take her there for a drink. When they said good night, March 24, 2191, seemed faraway in the future.

Next morning, however, when Rick woke up alone in his tiny expensive apartment, it didn't seem so far ahead. Karen's perfume clung faintly to his coat, and her red hair was still in his mind, but he couldn't help remembering that she was part of a world he had to leave. He began to wonder, rather grimly, how anybody ever made four million dollars.

Max Vickers telephoned him at the lab that afternoon. The loud, impatient voice brought Rick a picture of the branch manager—shrewd and driving, powerful in spite of his bulk and his paunch, with a black expensive cigar clamped unlit in the corner of his big, aggressive mouth even while he spoke.

"Meaning to call you, Drake. Good record as acting director, since Hawksbee went home. Good record. Going to make you the new director when we renew your contract. Raise; you've earned it. Ten thousand a year."

Ten thousand wasn't four million.

"Thanks, Mr. Vickers, but—"

Vickers didn't listen.

"Meaning to speak about your father. Know he's a native asterite. Understand he's trying to experiment with seetee. Crazy notion. Crazy notion, Drake. Interplanet doesn't like it. Better



break with him, Drake, if you want to succeed with Interplanet."

Rick was speechless, vaguely frightened.

"Got a new job for you, Drake," the loud voice pounded on. "Going to manufacture a new range finder for the Guard. Guard engineer is coming here to work out the final design with you."

"Why here?"

Rick was puzzled. His laboratory was equipped only to fight the war of space, the endless battles of gravity and atmosphere and temperature and radiation. The High Space Guard, he knew, maintained a great ordnance laboratory, out on Pallas II.

"Espionage," Vickers told him curtly. "Anders says the Guard arsenal is full of Martian spies—Anders is the engineer."

Vickers hung up. Sitting with his feet on the desk, Rick kept wondering gloomily how anybody made four million. He didn't know, unless by inheriting a few shares of Interplanet or pulling off a clever deal in Mandate politics. His mother's people had cut her off for eloping with a native asterite. And Rick had no taste for graft.

No, there wasn't any way to make four million. But Rick had come to share his father's mighty dream, and he began exploring the library for everything about the contraterrene drift. He found very little, for most men had tried merely to avoid its scraps of latent hell.

Captain Anders appeared unexpectedly one morning in early March, with Karen Hood for a guide. Rick was absorbed in the ponderous effort of a Martian-German astronomer to explain how a great contraterrene comet had shattered the then fourth planet, in the cosmic cataclysm whose debris made the asteroids and the seetee drift. He looked up with surprise to find Karen and the tall, graceful stranger already in the bright-walled metal office. He shut the book with a guilty start.

"Here he is, Paul." Karen's voice was a husky melody. Even in her trim green business suit she made a shattering impression. "Rick, this is Captain Anders. He landed on the *Planetania* two hours ago. I'm sure you two will get on with your research together, splendidly."

Rick put out a big, awkward hand and managed a space-burned grin. For an acquaintance of only two hours, he thought with a private bitterness, Karen and the captain were doing very nicely. He wasn't sure he and Anders would get on so splendidly.

Almost as tall as Rick, Anders stood spare and straight, and yet, somehow, wore his trim black uniform with an air of negligent ease. His luxuriant hair was wavy and dark and his piercing eyes had the gray of steel. Handsome as he

smiled, he gave Rick a hand as brown and powerful as his own.

"Hi'o, Drake." His soft, careless-seeming voice carried an Earthman's accent, clipped and rapid. He swung a black brief case to the sleek glass desk, and his quick eyes caught the titles of the books Rick had piled there—it was too late to move them now.

"Inter'stin' to meet you." The smile on his severe and intellectual face showed a possible brief amusement. "Karen tells me you're something of an expert on the seetee drift."

Rick caught his breath and tried to seem at ease.

"Not at all." He looked awkwardly at the accusing volumes. "I mean—I was just reading a little on it to pass the time."

Anders covered his amusement—if he was amused. "B'lieve your father recently made a spectac'lar use of seetee power."

"He did." Rick gulped uncomfortably. "But such a desperate, reckless feat is a long way from a real working seetee machine—" He bit his tongue. "It doesn't mean a thing."

"P'raps not." The blurred soft voice was a veil for thought. Anders turned easily to the tall, bright-haired girl, answering her smile. "Kind of you, Karen. You'll be at your uncle's reception, tonight?"

Karen said she would be, and Rick was numbed with a sudden jealous pain. Although he didn't like the Mandate House set, now he felt a surge of bitter regret that a junior spatial engineer didn't earn enough to belong to it. He tried to melt his stiff face into a smile, as Karen went out, without much success.

"S'prise!" Anders had followed her exit with dark brows appreciatively arched. "Always thought Mandate women would be scarce and uncouth. My mistake!" His brown hands snapped the brief case open and his clipped voice dropped to business. "Now, Drake, y' see our first problem—"

Rick cleared off the betraying books and they went to work. The tall, suave Earthman said nothing more about seetee. His fire-predictor, Rick quickly realized, was at least something more than a blind. Actually a robot-gunner, the device used klystron beams to train spatial rifles so that their shells could find a moving target, perhaps a thousand miles away and minutes in the future. Based on long-known principles, the instrument had a simplicity and accuracy that showed Anders to be a brilliant engineer.

Although the Earthman kept up his courteous, urbane reserve, as they worked day after day at drawing board and testing bench, Rick learned a good deal about him. Obviously he came of a family generations old in the tight, privileged aristocracy of Interplanet—such poised assurance, Rick knew, was never created in a single lifetime.

He had traveled on all the major planets. No situation ever found him at a loss. He belonged to the world of Karen Hood.

Rick's mother had come from that same proud elite minority, and he had been educated to be a member of it. But, before he left little Obania, he had already learned the equally proud ideals of the frontier democracy.

Now Rick felt lost between two conflicting worlds. He had to choose between them, and the choice wasn't easy. Half of him was eager to go back to his father, to attack the exciting problems of contraterrene research. But Karen Hood, in his troubled indecision, had come to stand for all the world that another rebellious part of him desired. More than a charming, self-willed red-head and a gay, lighthearted companion, she was clothed in all the stately power and the opulence of Interplanet. It wouldn't be easy to leave her.

On the last evening before his contract expired, Rick telephoned Karen's apartment, hopefully. He found that she was out somewhere with Captain Anders. Depressed and uncertain of himself, he walked away alone into the rocky wilderness outside the town to think his problem out.

Built on a barren, rounded hill, Pallasport was terraformed with a local unit at the bottom of a shaft only a few miles deep. As he left it behind him, its pull was back instead of down. The gravitation of Pallas itself was very slight. As the direction of attraction changed, the whole starlit desert seemed to tip. At last he was climbing up the cragged dark face of a world turned vertical.

A lonely, seeking giant, he climbed on until the city on the terraformed hill was only a glittering knob of metal and glowing glass, far down the dark wall of the upended landscape behind.

The air grew thin for he had mounted almost out of the paragravity field that held it. He stopped to catch his breath. Clinging with both hands to the dark, toppling cliff, he turned his head to gaze out and up and down into the black, mysterious gulf of open space. If he fell it seemed that he would drop forever and forever into that dark, illimitable chasm of far diamond suns.

He shivered, and his fingers tensed. Yet he enjoyed this eerie sensation—it was what he had climbed to seek. For this was the other half of him. He had learned in childhood to love the splendor and the peril of this strange new frontier against the stars.

Something stirred deep in him, wild and free. He could feel in himself the beginning urge of human might, responding to this dark, tremendous challenge. The call of space was in his blood, as old as his love for his mother, stronger than his

love for Earth and Interplanet and even Karen Hood.

He clung there a long time, breathing consciously and deeply to keep alive in the chill thin air. All his confusion seemed washed away in this dark and boundless spatial sea. He felt strong again, strong to say good-bye to everything he must.

He was ready to climb down when he saw the new star.

It blazed out suddenly where no star had been—more swiftly, he thought, than any nova could. Hot and blue-white, it dimmed and drowned the other stars. It hurt his eyes and flattened the mystery of this dark, toppled wilderness, and cast harsh shadows.

The new star grew brighter, he thought, than any remote nova could be. The hot sting of its radiation brought him a pang of fear, for he had no leaden spatial armor. He crouched back into the shadow of the cliff.

After a few more seconds, however, it began to fade. It disappeared as suddenly as it had come. At last his dazzled eyes could see the other stars again, but it had left no trace. No nova, he was certain, would have vanished so quickly. He couldn't understand it.

He shivered again. The dark spatial night had reached out to touch his heart with the bright and chilling finger of its veiled eternal mystery. He felt its awe and dread, yet somehow he was stirred and lifted with a sense of human might and human daring. Humbly, he shared the human greatness that had begun to conquer worlds never meant for men.

Then his icy fingers slipped on the rock and he was conscious of a giddy weakness. He had forgotten to breathe—and the carbon dioxide, at this low pressure, escaped from the lungs too swiftly to stimulate unconscious breathing. He fought for oxygen and strength, and climbed slowly down toward Pallasport again.

## II.

Rick's own vexing problems seemed to grow again as he climbed down from that giddy, fictitious height above the town. Karen's blue-eyed smile came back to haunt his resolution. By the time he reached his small apartment he had forgotten that oddly temporary star. The telephone roused him, early next morning, from a tired, uneasy sleep.

"Scuse me, Drake." It was Anders. "Can you come right down to the lab?"

That was all the Earthman said, but his slurred voice had an imperative undertone. Rick omitted breakfast and hurried to the laboratory, just under the crown of the terraformed hill. Still in the dress uniform that he had worn somewhere with Karen, Anders hadn't been to bed.

"G'day, Drake." He was swiftly gathering all their notes and plans for the fire-predictor. "My gadget's got to wait, 'cause we've got another job. S'pose you heard about the star last night?"

"I saw it, and wondered—"

Rick's voice trailed off, for Anders had snapped the brief case shut and suddenly he stared at Rick with some searching question in his hard gray eyes.

"And what d'you think it was?"

"I don't know." Rick moved awkwardly, under that cool, piercing gaze. "When the contraterrene drift strikes a normal body the explosion makes a flash. But that looked big enough to have been predicted—"

"But you did know it was seetee?"

"What's the matter?" Rick heard the snap of anger in his own voice and envied the tall officer's self-possession. "I don't know anything. I just

happened to see something like a star that flared up and went out."

The dark, suave smile of Anders made him feel a fool.

"No 'fense, Drake." His eyes flickered toward the row of books he had caught Rick poring over. "But our mysterious little nova was a contraterrene asteroid. That's why I called you down."

"Why me?" Rick felt puzzled and uneasy.

"As a seetee engineer," Anders said, "I hoped you could solve a riddle for us."

"I'm not a seetee engineer," Rick told him. "But what's the riddle?"

The steel eyes of Anders dropped to some notations on a card.

"You only saw the flash? Well, it came from the seetee asteroid, HSM CT-445-N-812, now about forty million kilometers from Pallas. The *Ephemeris & Register* lists it as thirteen hundred



meters in diameter, with a dagger to indicate it's probably contraterrene iron."

"But what did it hit?"

"That's part of the riddle," Anders told him. "Happens the area was under observation from the Guard Observatory on Pallas I. Young chap at the three-meter camera was watching through the guide 'scope. This seetee asteroid was in the field, and he could see the flash of the blinker. The glare of that explosion ruined his last plate—and nearly blinded him. But the other plates should have showed anything else in the vicinity, down to twenty meters. There's nothing."

Rick's big brown fingers had begun an absent drumming on the end of the bright glass desk. Anders looked annoyed, and he stopped himself awkwardly. "What do the telescopes show now?" he inquired. "Is the surface still glowing?"

Anders looked at him for half a minute before he said softly, "By no means, Drake. The first bolometer readings were taken less than fifteen minutes after that flash. They average about seventy absolute—two hundred degrees below zero."

Rick caught his breath in speechless perplexity.

"The 'scope gave us a few more surprises," Anders went on. "Difference in shape and surface markings. New estimates of mean diameter fifteen hundred meters, instead of thirteen hundred. A change in the orbit—now it's on a sharp parabola, shooting out of the System at forty-five kilometers a second." His hard eyes were almost accusing. "What do you make of all that?"

"It doesn't mean a thing to me," Rick blurted. "And I don't know why you think it should!"

Anders didn't say why. His bland aplomb made Rick feel uncomfortable. Balancing the black brief case on the corner of the desk, he announced deliberately:

"Drake, we're going to solve this little problem. I have authority to requisition an armed cruiser from the Guard base on Pallas II. I expect to leave tonight, with a picked staff of engineers. I'll arrange with Mr. Vickers for you to come with me."

Rick felt another flush of needless anger.

"Vickers can't arrange it." He tried to keep the ridiculous quiver out of his voice. "You see, my contract with Interplanet expires today. I don't intend to sign another."

The gray eyes of Anders narrowed with a watchful I-thought-so expression. "I'd been wondering, Drake." His slurred rapid voice didn't change. "If you quit Interplanet, what are you going to do?"

"That's my business."

"Don't get angry." With a half-amused smile, Anders offered a long cigarette. "Though praps you've reason to be." His voice dropped with an

affable candor. "As you may have suspected, my real business here is to investigate the military possibilities of seetee."

"I had an idea," Rick admitted. "But I don't know anything about seetee."

"Prob'ly you know as much as anybody," Anders assured him blandly. "If it's money, I'll see that Vickers pays you anything in reason."

Rick shook his head, not trusting his voice.

"S'long, Drake, if that's the way you want it." Anders shrugged, a meaningless graceful gesture. "Hate to see a good engineer go wrong, but I've got things to do."

He took up the brief case and went quickly out. Alone, Rick sprawled across the end of the desk, lost in an anxious study. Anders worried him. Backed by the Interplanet billions, he might win the race to conquer seetee.

Rick's uneasy thoughts turned to the runaway asteroid. Its contradictory riddle fascinated him. He could see no possible rational explanation. He tried to dismiss it for his own unsettled affairs, but his mind refused to put it down.

"Rick." Karen spoke behind him, a vivid picture framed in the metal doorway. Her high-cheeked face was bright with color, but her husky voice seemed troubled. "Paul just phoned. He says you're leaving Interplanet."

Rick tried to smile, and gestured at his own chair. But she came to the end of the desk, so near he caught her expensive perfume. Her eyes were somber pools. His decision was going to be hard to defend.

"Why, Rick?" Something made her breathless. "Did you quarrel with—Captain Anders."

"Call him Paul." He managed a brown, feeble grin. "He admitted he came here to spy on me, but still I rather like him. He's what I've been trying to be, Kay." His big shoulders shrugged. "Just seems I'm not."

"He's loyal to Earth and Interplanet." Under the flame-red hair her face was a tense triangle. "I thought you were, Rick."

Her vital nearness was a twisting pain.

"Please try to understand." He drew a long slow breath and envied the finished ease of Anders. "I've tried to be an Earthman, Kay, but I was born out here. You can't be loyal to everything. I'm going into partnership with my father and old Rob McGee. Please, Kay—I tried."

Her red mouth looked hurt, and her voice was scarcely a whisper. "I'm afraid I can't understand. You're doing well with Interplanet. Vickers will give you nearly anything you want. Paul says you have a brilliant future—if you'll only wake up."

"I have waked up." His tense voice quivered. "When I came out here, five years ago, I thought Interplanet was the shining benefactor of the



human race. I had ideals, about the calling of a spatial engineer. I wanted to turn these dead little rocks into gardens for men."

Karen stared at him. Her pointed face had turned a little pale, and something cold was glinting in her eyes, and he knew she didn't understand.

"Ideals aren't what you need in Interplanet." His voice dropped to a bitter rasp. "Get all you can as soon as you can. Sweat and tax and graft the last dollar out of the damned asterites, and take it back to buy a penthouse and a mistress and the gout in Panama City." Her face went white, as if he had struck it. "Well, that's not for me. I'm sick of Interplanet, and the rotten Mandate politics—sick of spying and intrigue and corruption. I'm quitting, now."

Then he saw that she was crying, blinking at her angry tears and biting her full, trembling lip. He relaxed his tanned awkward hands from gigantic fists and said more gently:

"I'm sorry, Kay. I didn't mean to tell you all that—but it's still the truth. I don't belong in your world. I'm just another asterite, and I'm going back to Obania with old Rob McGee."

The girl clung with white fingers to the corner of the desk. She tossed a flame-colored strand out of her wet face with an angry gesture and mopped with a useless little handkerchief.

"You're unjust, Rick—dreadfully unjust." Her hurt set a numb longing in him. "Such talk is almost treason. Interplanet needs you, Rick. It needs us all, now when the rebel planets are scheming for another war, to wipe it out this time. I know some men are selfish grafters. But there have been, and will be, others loyal and noble enough to die for Interplanet. I thought you'd be one of them."

She looked at him with blue-black eyes, angry but yet hopeful. He shrugged unhappily. It wasn't really any use to speak, because he knew she would never understand. But he tried.

"You have to feel that way," he said, "because that's the world you belong to. And I don't." Awkwardly, he caught her small tense hand. "I'm sorry, Kay. I really tried to be an Earthman, but it isn't any use."

She freed her cold hand and turned away from him. He thought she was going to run out of the room. He took a long, impulsive stride after her.

"Wait, Kay. I mean . . . I'll see you again before I go?"

She paused in the doorway, mechanically pushing back the stray bright wisp of hair. Her eyes were dark and thoughtful, dry again.

"I don't suppose it matters." Her voice was dull and husky. "I'm having lunch with Paul." She caught her breath and came back a step.

"Rick, why don't you go out with him—out to study this runaway rock?"

"My contract expires today."

"Please, Rick!" Her tone of urgent appeal set a slow pain in him. "That rock's a danger to Earth and Interplanet. It seems to be breaking all the known laws of science. Because, Paul says, it obeys an unknown law. And that unknown law may be a key to power."

Her eyes were dark and imploring.

"Interplanet is still in terrible danger, Rick, because the Treaty of Space didn't really end the war. All the Mandate is torn with a secret battle for power between us and the Martians and Venusians and Jovians, and even the Free Space Party of the asterites." Her low voice trembled. "Won't you go out with Paul?"

Rick wanted to go. The runaway fascinated him and Karen was hard to refuse. She saw him hesitate, and the hope on her bright, pointed face caught his breath. He gulped.

"No, Kay." Her expression hurt like a wound. "I guess I belong with the Free Space Party."

"Traitor!" She sobbed the word and ran.

Rick slumped wearily behind the glass desk and tried to be a philosopher. After all, he told himself, you can't have everything. But philosophy began to crumple. Perhaps he could join Anders without signing a new contract. He was reaching for the telephone to call Karen at the office when it rang.

"Richard Drake?" he heard the operator. "Photophone calling you from the *Good-by Jane*. Will you receive the call—five dollars for two minutes?" He said he would. "Then please stand by, sir. It will be a few minutes, for the ship is nearly forty million kilometers away."

Rick stood by, wondering. He had supposed that Rob McGee would come straight to Pallasport—what could have carried him so far away? Memory, while he waited, brought a picture of the thickset little spaceman, brown and squinted, with a black pipe clamped in the middle of a square, stubborn face.

"Hello, Rick." The gentle drawling voice came at last along the endless thread of light. "I think your Interplanet contract expires today, and your father says you want to be a partner in our own little firm of spatial engineers. So welcome to Drake, McGee & Drake!"

"We really need you, Rick. I've been Jim Drake's partner since before the war. I think we've made a good team, too, though I'm just a plain rock rat and he's the engineer. But now we're getting old, and your father's plans will want a man—the sort of man we think you are."

"But two minutes isn't long, and this is why I called you, Rick." The soft, quiet voice seemed to hurry and it held a tired excitement. "Some-

thing's happened. I left Obania with a cargo of bad news for you. I started out to tell you that Drake & McGee were ruined and we didn't have a chance to build that metallurgy lab. But something happened, on the way, and things are different now."

Rick sat up and listened desperately.

"I can't tell you much about it now," the hurried drawl continued. "But you know your father's estimate on the cost of the metallurgy lab. Well, it seems that you and I have got a chance to make some money, Rick—all the money we'll need.

"I can't tell you everything." Rick thought he was trying to speak indirectly for the benefit of spies. "But I'll be landing at Pallasport tonight. Better get your space bag packed and kiss your girl good-by, because it's quite a job that you and I have to do!"

Rick caught his breath. The rustle of interference reminded him that McGee was forty million kilometers away, and he couldn't possibly be landing tonight. The ancient little tug would take something like a week to cover such a distance. He gripped the receiver, frowning.

"You'll come to understand why I can't tell you everything," McGee hastened on. "You wouldn't believe it if I tried. But there's a fortune waiting for us on that runaway rock. We'll have to solve the riddle of it and beat out Captain A.

"It's really quite a job, but don't give up too soon. Remember that the last shall be first, and first the last. I may even stare and say I didn't call you, but pay no attention to that. Because the prize is waiting for us. Perhaps we'll meet more riddles, but we can finally crack them all." The two minutes were gone and McGee finished hastily: "Better not reply."

The receiver snapped and Rick heard the operator:

"Do you wish to call back, sir?"

"Eh?" Rick muttered vaguely. "No, there's no reply."

A mused and wondering giant, he sat with elbows propped on the bare glass desk. He didn't understand. But he gave up any idea of joining Captain Anders. Even if the *Good-by Jane* couldn't possibly arrive tonight, Rick intended to be waiting with his space bag packed.

### III.

The telephone blurred again. Karen's small, stifled voice set a hopeless ache in his throat. "Rick? Mr. Vickers wants to talk to you."

He waited for the loud, impatient voice of Vickers.

"Drake, Miss Hood tells me that you're going to leave us. I have no time to argue with you, but I believe you're still in our employ till six

o'clock today. There's one more job for you to do."

"What's that, Mr. Vickers?"

"Change the tuning diamonds in the terraforming units on Pallas IV," Vickers said. "A prison tender will call for you at the spaceport in an hour. That will give you time to pick up the new diamonds here." Vickers hung up.

Pallas IV was one of six small terraformed rocks which had been moved into stable positions, sixty degrees apart in the same close orbit, as trailing moons of the minor planet. They served as outposts and bases, and Pallas IV was also site of the Mandate prison.

Rick found a kit of tools and went to the huge blue-glass-and-platinum-plate Interplanet Building to get the extra diamonds. The job was not difficult, and he wondered why it hadn't been left to the prison engineer.

Karen Hood, at her own important-looking desk in the manager's outer office, was dictating into a machine. She looked up with a pale, empty smile, and silently handed him the order for the diamonds. Rick wanted to say something friendly but she turned quickly back to the machine.

He took the order to the supply-room wicket. Under the eyes of a guard he had to sign a receipt for the three small diamonds, value seventy-five hundred dollars. They were clear natural octahedral crystals. He dropped them into the little black pouch the clerk gave him and strode toward the spaceport on the crown of the hill.

Their cold soapy glitter reminded him of McGee's promise of a fortune waiting on the runaway rock, but he shrugged off the thought of a diamond strike. Men had no use for contraterrene diamonds.

An ugly black torpedo, the prison tender was already standing on the convex pavement of the field. An alert, polite young subaltern met him at the Guard office and ushered him aboard. Half an hour later they were landing on the prison asteroid.

Pallas IV was a thousand-meter block of dark nickel-iron. Marker lights picked out the landing field and it had an atmosphere. But the guns and the barracks, and even the prison itself, were all hidden in its natural armor.

They left the ship. Beyond a hidden doorway a guarded elevator dropped them to the terraformer room at the center of gravity. There, between the polar elements, their bodies had no weight, and hand lines were strung about the machinery. Rick asked the young subaltern:

"Which unit is giving the trouble?"

"None of them." The officer gave him a friendly smile. "You're to change all the crystals. The warden's orders. A safety measure."

That seemed odd. The tuning diamonds were sometimes ruined by accidental short circuits, but

they simply didn't wear out. The news ones would be no safer than the old. Rick changed them, however, one by one. He reset and tested the units and gathered up his tools and nodded at the alert subaltern.

"Finished?" the guardsman asked cheerfully. "Say, care to see the prison while you're here? I must report to the warden and it will save us time if you come with me."

"Just as you like," Rick agreed, though he wasn't anxious to see the prison. He showed the little pouch of used diamonds, all as good as new. "But I'm responsible for these, remember."

"They'll be safe," the subaltern assured him. "We're only walking through the political cell block."

A double set of clanging steel doors let them into a wide gallery, cut deep in the living iron. Faced with open bars, the cells were three levels high. Gray steel ladders and catwalks reached the upper tiers. The light from the translucent ceiling was a chill blue glare. There was a stagnant reek of human confinement. A glimpse of dead-white faces peering stupidly through the bars made Rick hurry his long stride uncomfortably.

"Slow," his guide warned softly. "You might get shot." Rick checked himself, suddenly conscious of the guns looking out of armored slots. Trying to soften his evident discomfort, the subaltern told him in a brisk undertone:

"This isn't so bad. These men aren't abused. This is our model block, really. Political prisoners, you know. They aren't forced to work. The food is good enough, and we give them all the liberties possible. They leave the cells for meals. They are allowed books and stationery. They get two hours of exercise a day." His lowered voice had a ring of professional pride. "Modern penology, you know—justice, discipline, and reconstruction."

Rick managed a sickly grin. "That doesn't appeal to me—"

"Drake!"

It was a penetrating scream. Startled, Rick turned to see a hollow ghastly face peering at him through the bars. The second level. Thin, bloodless hands rattled the locked door furiously, almost drowning that cracked and terrible voice. "Drake—have you seen my Mary?"

Rick had stopped, but the subaltern touched his arm.

"Come along," he urged quietly. "You aren't allowed to talk."

"I don't know him." Rick hurried on again, trying to shake off the agony of that dry scream. "I never saw him."

That blade-thin voice slashed after him:

"Wait, Drake! My Mary—is she dead?" Rick

strode on, hot and breathless. The voice turned thick and foul, cursing him. Then it was thinned again with a frantic mental agony. "Speak to me, damn you, Seetee Drake!"

Rick went on, but now he understood. Old Jim Drake was roan and shrunken now, stooped with sixty years. But the prisoner must have known him long ago when he was as erect and powerful as his bronze-haired son.

"I'm sure you couldn't know him," the brisk young subaltern was agreeing. "Because he has been here nearly fifteen years. Life, on a treason charge—he was convicted of membership in the Free Space Party."

The dry voice cursed again, despairingly.

"Gone simple," the subaltern said. "He thinks this Seetee Drake is going to make weapons out of the contraterrene drift to overthrow the Mandate."

Rick shot him a startled glance, but his pink young face was innocent. "Seems there really is an old meteor rat named Seetee Drake," he went on. "But I guess there's really no danger he'll work the drift—or the Guard would have him in here with his friends."

Silent, Rick tried not to shiver. He felt a little ill from the sharp prison feter and the harsh blue glare and the crushing weight of the living iron above. That dry scream kept ringing in his mind. He couldn't help wondering why his guide had brought him this way.

He tried not to hurry. He forced himself to listen to casual statistics, about the prison bake shop and the laundry and the ventilating system. At last they were outside the clanging gates again in air that he could breathe.

"Sorry for that disturbance," the subaltern said briskly. "Unfortunate. Forget it. Wait here just a moment while I see the warden. Have you back at Pallasport in plenty of time for lunch."

Rick waited before a silent guard. The subaltern chatted innocently on the way to Pallasport. Rick hurried to the Interplanet Building to unburden himself of the diamonds. Returning his receipt, the clerk at the window said:

"A message for you, Mr. Drake—you are to see Miss Hood."

"Hood? With a 'w'—nope—that" Karen had recovered from her hurt and anger, she burst eagerly into her office. Beyond the huge busy desk, she seemed small and tired. Her pale triangular face looked up, unsmiling. Her small remote voice crushed his hope.

"Rick, my uncle wants you to have lunch with him."

Rick was astonished. "Mr. Hood?"

Her flaming head made a spiritless little nod. "One o'clock, at the Mandate House—if you are free?"

"People are usually free to lunch with the chief



commissioner." Rick managed a hopeful grin, but still she didn't smile. "Tell him I'll be there."

Rick went out awkwardly and stopped at a bar for a whiskey-soda—because there was nothing else to do about Karen's hurt coolness toward him. Back at his apartment, he tried to bathe off that sour prison odor and put on a clean shirt for the chief commissioner. He felt a bleak envy of Captain Anders' finished social form for he knew that Austin Hood was the most important man in the Mandate.

Still he was puzzled about the invitation. Perhaps Hood was taking time to persuade him to sign a new contract—though Rick didn't feel that important. Anyhow, he grimly told himself, they all belonged to an enemy world. Even Karen. The prison had convinced him of that.

At one o'clock he was striding through the ornate golden portals of the Mandate House, a tall and resolute giant. Just across the curving street from the capitol buildings, that expensive

bar and grill catered to officialdom. The cost of living was high in all the Mandate, because the commissioners refused to let the asterites make themselves independent of imported food supplies. And prices at the Mandate House were fantastic.

Rick paused in the doorway of the bar for he wanted another drink to help ease his social awkwardness. The long room was dimly lit through a red glass ceiling, and paneled with expensive black Venusian ebony. The air was thick with smoke and alcohol and guarded talk in four languages.

The surface atmosphere was friendly, but Rick could sense a watchful tension. The blond, sunburned attachés of the Martian commissioner were gathered at the table of a grim-jawed, bullet-headed visiting general. Nursing heavy steins, all very stiff and courteous, they seemed withdrawn to themselves. Huge, bearded men from the Jovian Soviet were industriously drinking vodka, cheerful and noisy and yet alert. The Venusians, at

a table of their own, were sipping rice wine and tea with an air of bland secretiveness.

A group of Earthmen were drinking whiskey-sodas at the bar and they seemed to Rick a little too confident and loud. One of them, a very junior official, beckoned him to join them. After he felt the tension of veiled mistrust in the long, smoky room, however, he decided to keep himself alert to deal with Commissioner Hood.

He waited in the garish, crowded lobby until Hood arrived with Commissioner Rand—Earth held two of the five commission seats. Several uniformed aids accompanied them, but Hood left the group and came across to Rick. He was a heavy, ruddy man, with a thin fringe of red hair around his balding head.

"Glad to see you, Drake." Karen once had introduced them and he had a politician's memory for faces. "If you don't mind, let's eat alone. We've got business to discuss—but not till after lunch."

Bluff as some old hard-rock miner, he waved affably at his overmannered aids and Rick followed him into a luxurious private room. The order seemed important as a government decision; he finally selected capon with dry Martian wines.

At first Rick felt stiff and diffident. Perhaps the wine helped to melt his awe; as the meal went on he began to regard his host with a mixture of admiration, amusement and unexpected liking.

Hood's qualifications for his difficult position seemed to consist of an excellent digestion, a ruthless political cunning, and a stock of improper anecdotes. Digestion, evidently, came first.

"You think I'm a hearty man, Drake?" he boomed happily. "Well, it takes a hearty man to fight the war all over again, every day, in the commission chamber. The last three chief commissioners went home with peptic ulcers. It takes a hearty man!"

Rick still wondered what he wanted. He said nothing of any business until the wine was finished and they had lighted rich blond Cuban cigars. Then, in a loud genial voice, he inquired surprisingly:

"Young man, why don't you marry my niece?"

"Better ask Captain Anders." Rick had gulped and his tone was slightly bitter. "They're eating in the grill right now. She's a little cool to me."

"Nonsense!" boomed the hearty commissioner. "You've simply hurt her feelings. She talked to me this morning. Tell her you're going on with Interplanet and she'll forgive you in a minute. Why not, Drake? She has looks and money and brains. Her family, if I may speak—"

"I know what she has." Rick was too violent. "But she belongs to a different world."

"Her world owns the Mandate and the System." Hood was pink and ominous. "I believe you saw

another world this morning—out on Pallas IV."

"Did Kay—" Rick gasped.

"No, it was my idea." Genial again, Hood exhaled blue smoke. "For your own good, Drake. I want you to see the consequences of your insanity before it's too late to change your mind."

Rick caught his breath. This revelation was a jolt to his new liking, yet in the face of Hood's genial humor he couldn't feel very angry. He said gravely, "I don't intend to change my mind."

The politician gestured amiably with his blond cigar.

"Wait until you've heard my proposition, Drake," he urged. "I've talked with Vickers and Anders and my niece, and they're all agreed that you're the sort of man that Interplanet needs. And Interplanet will meet your price."

Rick was not surprised to hear him speak for Interplanet. Officially, he represented the Earth-Moon government, but that government was only a veil for Interplanet's power.

"These times are unsettled," he went on. "Uranium is getting scarce, you know, and there's a scramble for what's left. The Mandate is only a sort of referee for a four-cornered fight—or five, if you still count the Free Space Party."

Rick listened uncomfortably. He wasn't used to smoking much, for Earth-grown tobacco was an expensive luxury, and he decided to abandon the strong cigar.

"Now there's talk of seetee," Hood went on. "I thought it was impossible. But Anders says the Martians are experimenting with seetee bombs, and probably the Jovians, too—for they have shot some good intelligence agents. Interplanet is being left behind. We need a good contraterrene engineer. You're the man I want."

Resolutely, Rick began: "I don't know anything—"

"You'll be paid to learn." The blond cigar gestured expansively. "Write your own budget—and I'll see that it isn't audited. Interplanet expects to pay for services rendered. You can put a million in the bank—or ten million—if you can give us seetee bombs before the Martians get them."

"I'm a spatial engineer, Mr. Hood." Rick stood up at the table, blurring the words in a tight, angered voice. "I came out here to terraform worlds for men to live on—and not to graft a fortune."

Hood leaned back to watch him with an air of mild curiosity, the bright small eyes interested and shrewd.

"Some things you can't lock up forever, Mr. Hood." The surge of long-pent feelings wouldn't let him stop. "You can keep men buried alive on Pallas IV—but not the ideals of freedom and democracy and right."

Hood's small eyes had narrowed, but he plunged



on recklessly: "If you were wise, Mr. Commissioner, you would take the brakes off progress in the Mandate. You would let men terraform these rocks and make hydroponic gardens. You would give the asteroids political equality and a seat on the commission. That would change the Mandate from a powder magazine to the beginning of a real union for interplanetary peace."

"That sounds like treason." Flushed and angry, Hood stood up. "That's the program of the Free Space Party. You had better remember what you saw on Pallas IV." He gulped his anger suddenly and put on a politician's ready smile. "But I'm grateful for your candor and you won't suffer for it. I only hope you reconsider your rash opinions before they lead you into some action you'll regret."

His eyes, however, were not quite so kindly reassuring as his genial voice, and Rick felt apprehensive as they left the private room. Hood went back to his waiting group. Lost and uneasy, Rick returned to the laboratory to wait for six o'clock.

An unfamiliar guard met Rick at the door and watched suspiciously while he cleared a few personal effects out of the big glass desk. He kept fighting down an impulse to call Karen Hood again because it seemed that there was nothing more for him to say.

No, he couldn't kiss his girl good-by. At five minutes of eight, however, he was striding into the spaceport waiting room, carrying a big plastic bag packed for several weeks at space. Watching the clock tick off Mandate time, he waited for the impossible to happen.

It did. At one minute of eight a speaker suddenly blasted: "Landing from Obania, the space tug *Good-by Jane*, Captain McGee. Now coming in to Berth 81."

Rick burst eagerly out of the room to stare into the blue-black sky whose Sun stood near the zenith—few of the minor planets fitted their days and nights to Mandate time. He found the *Good-by Jane*, dropping gently toward the convex field. It resembled an oblong box of rusty steel, turned on end. It touched and swayed on creaking ground gear, beyond the yellow ropes.

The air lock opened as Rick came up and Captain Rob McGee descended the accommodation steps on small, nimble legs. He wore the same mildew-green spacecoat that Rick remembered seeing five years ago, and his sturdy shoulders looked heavy with trouble. His square leather face made an effort to smile.

"Glad to see you, Cap'n Rob." Rick dropped the bag to grip his stubby hand. "I got your call this morning and you see my space bag's packed. Now can you tell me—"

Rick's voice faded suddenly, for the little space-

man blinked and a blank bewilderment came into his squinted red-brown eyes. "My call, you say?" His gentle drawl was puzzled. "But I never called you, Rick. Bad news will keep and I had none worth good money to tell."

#### IV.

Concern overcame Rick's first shock of wonder for he knew the consuming danger of the contra-terrene drift. "Bad news?" he repeated anxiously. "Has anything happened to—my father?"

"It's only worry," drawled little Rob McGee. "He's been working day and night designing machines to work the drift—but he's not too old for that. It's worry that's killing him now, because we're about to lose Freedonia."

"How can that be?" whispered Rick. "Didn't they grant the title?"

"They had to." McGee's shaggy yellow head shook bitterly. "But they didn't want to give it to us and they found a way to take it back again. Taxes! At first the revenue office sent a notice that they would be two hundred dollars a quarter. Last week we got another notice. The new assessment is forty thousand a year—and now they say the other was a clerical error. The first ten thousand is due March 31st with only ten days' grace."

Rick said angrily, "That's out of reason!"

"Tell that to the revenue office," McGee said gently. "It's plain confiscation—but no asterite ever won an appeal." His face was a taut leather mask. "If we don't find ten thousand dollars by April 10th we lose Freedonia."

"I have a few thousand," Rick offered. "What do you lack?"

McGee spread his short, space-burned hands in a hopeless gesture. "We're flat," he said. "Ann O'Banion put in nine thousand, but that's all gone." He hesitated. "But there's one way that you might pull us through."

Rick said promptly, "I'll do anything I can."

"Your father's idea," McGee said slowly. "He thought you wanted to go on with Interplanet. He said you might make enough to pay the taxes while we look for money to build the lab."

Rick looked down at the little spaceman, kicking uncomfortably at the pavement. His big shoulders drew erect, and his bronze head lifted to the velvet blackness beyond the red sunlit hull of the *Good-by Jane*. His face broke slowly into a hard brown smile.

"No, I'm through with Interplanet." His voice had a ring of decision. "I'm going to help you work seetee."

"I'm glad you feel that way." McGee gave him a space-beaten smile that faded into worry. "Though I don't see much that we can do. Even if we could pay the taxes we need millions more to build the shop your father's planning."

"We can race Captain Anders after that run-away rock," he said, "and look for the fortune you said was waiting there."

McGee shook his straw-colored head blankly.

"I said?" he protested gently. "I've been watching that rock—and I can't understand it. I don't know anything about a fortune on it—and what could you do with a fortune on a seetee rock?"

Rick stared back. "You aren't—joking?"

"I like mathematical puzzles." The little space-man was serious as a child. "But I never just joke. I saw that rock—the seetee rock that flamed up like a nova, when nothing the size of your fist was near enough to collide, and then went out like a light you turn off and started streaking away from the Sun. But I didn't call you, Rick—and I certainly don't know where to find a fortune."

Rick stepped back a little, frowning.

"It was a peculiar call," he muttered. "The operator said you were nearly forty million kilometers away. And you told me to pay no attention if you said you hadn't called." He made a baffled shrug. "Maybe I was dreaming—I don't know. What about it?"

McGee's squinted eyes looked suddenly away. "Who's your military friend?" he asked softly. "A man as tall as you are, Rick!"

Turning, Rick saw Captain Anders striding across the convex pavement from the Guard station. Behind him, trucks were unloading supplies at the air lock of a slim two-gun cruiser. Camouflaged a lifeless black, its tall torpedo shape was only a shadow against the blue-black sky. Vaulting a yellow rope, Anders came to them.

"H'lo, Drake." The tall Earthman was careless and assured. He wore Interplanet's ancient greatness, Rick thought, like a cloak of invisible power. His handsome face broke into a cool, friendly smile, and he looked expectantly at McGee.

"Captain Rob McGee." Against the armor of that long-bred superiority, Rick felt almost naked and he blurted the introduction awkwardly. "Captain Paul Anders, of the Guard."

"G'day, McGee." He wasted no title on the master of a mere civilian tug. McGee winced from the pressure of his powerful hand. His steel eyes came back to Rick, casual and yet watchful. "We're taking off shortly," he said. "Last chance to join us."

"Thanks, no." Rick waited, thinking that Anders must have really come for something else. The hard gray eyes flickered sharply at little Rob McGee.

"P'raps you've got plans of your own?" Rick could sense the cool alertness behind that easy, friendly voice. "Might int'rest you to know that I have a transcription of that rather curious photo-

phone call you made at nine this morning."

"But I didn't—" McGee gulped and checked his protest.

Rick felt a chilly tingle along his spine. Then the call hadn't been a dream—but still he couldn't understand it. If somebody had been imitating McGee's voice—for what reason Rick couldn't imagine—Anders evidently knew nothing of the plot.

"S'prised to find you here, McGee." The sleek assurance of the black-uniformed officer seemed to cover a wary vigilance. "Our agent reported that your call came from a point within a few million kilometers of the runaway. How did you get here?"

Rob McGee had turned into a brown, impassive image.

"I made no call." Rick was struck with admiration for his serene calm. Anders wore Interplanet's power like a mantle of supremacy. But the little asterite seemed to have learned the eternal quiet of the stars he knew. He squinted affectionately at the square, drift-pocked hull of the *Good-by Jane*. "I haven't been beyond Obania."

"Prob'ly the photophone office made an error in position." The cool, slurred tone of Anders said that McGee was a liar. A shrug of his black, magnificent shoulders dismissed the little space-man and he swung back to Rick. "S'pose I'm your Captain A." His questions had a brittle snap. "You think you've got a clue to the mystery of that rock? You expect to beat me to the answer—and get a fortune out of it?"

Rob McGee was shaking his head in blank protest. But Rick caught his breath and his brown face lit with a stern fighting smile.

"Why not?" The ring of new purpose in his voice stilled McGee's protest. "The *Ephemeris* lists that rock as unclaimed. We've got as much right to put our notice on it as anybody—if we can get there first."

Anders nodded. "But the *Ephemeris* also lists it as seetee."

Under his hard, wakeful eyes, Rick merely shrugged—for he knew no answer to that.

"Course you've got a right to try." Anders turned carelessly friendly again, like a veteran actor changing roles. "But please step over here and let me show you exactly what you're going up against."

They followed Anders away from the rusty little tug to a point that gave a good view of the tall black cruiser. The two long spatial rifles, counterpoised in two opposite turret blisters so their recoils wouldn't spin the ship, lay flat and ugly against the hull.

"Look at that—and *that*!" His handsome, scornful head jerked back toward the stubby *Good-by Jane*. "We can overtake that rock several days

ahead of you with twenty men—several of them competent engineers. What chance have you two got?"

"I don't know." Rick found a perverse encouragement in the very effort to dissuade him and that hard fighting smile came back to his eyes. "Maybe you'll get there first, but the first shall be last, remember?"

Anders returned the smile and Rick wondered if anything could ever crack his iron assurance. "How does that apply?"

Rick didn't know, but he merely shrugged again. Anders fired a long cigarette with a gesture of careless ease but Rick could hear the frosty snap of danger in his voice.

"Follow if you like—it makes no difference to me. But I intend establishing a military sphere about the runaway as soon as our guns are in position to enforce it. Civilians will not be allowed within a hundred kilometers. Think that over."

Rick thought it over with a glance at Rob McGee's square uneasy face. After five years of submission to Interplanet, it was oddly pleasant to make a gesture of defiance; and the inexplicable behavior of the runaway was still a lure that drew him.

"I think we'll come along," he said. "We've nothing else to do."

"As you like." Anders contained his feelings beneath a friendly indifference. "S'long." He waved the long cigarette. "Prob'ly we'll meet you on our way back." His hard military heels clicked away toward the tall black warship.

Little Rob McGee shook his head again, protesting:

"No matter what they heard, I didn't make that call."

"It sounded like you." Rick grinned suddenly. "Anyhow, it has Anders worried as much as we are. Just put it down as one more item in the puzzle we've got to solve."

McGee peered at him. "You really mean to go?"

"Why not? The solution to the puzzle of the rock might be worth the fortune you didn't say it was. Maybe we can beat Anders. If you're willing, I've got money for expenses. We've really nothing else to do."

McGee's leather face crinkled. Without a word he put out his hand.

"Then we've got no time to waste." A tall and eager giant, Rick gripped the hand so hard he winced again. "The runaway is already more than forty million kilometers away. At a guess—"

"There's no need to guess," McGee said softly. "At this moment the rock is forty-two million seven hundred sixty-one kilometers from Pallas. Present velocity is forty-six point four kilometers a second, well above the velocity of escape from the System. If we start by midnight we can over-

take it in five days, eighteen hours and twenty minutes. That cruiser is more than twice as fast as the *Jane*—Anders can reach the rock in about two days."

Rick opened his mouth and shut it again. He had almost forgotten Rob McGee's peculiar gift. But he had known the quiet little spaceman when he was a child on Obania; and now he remembered that McGee always knew what time it was, to the split second, without looking at a watch.

"Check those figures if you like." McGee saw his astonishment. "You'll find them right. Things like that—distances and velocities and accelerations—they're just plain to me." He seemed to grope for words. "I just—know them."

"I remember now." Rick's voice held a wondering admiration. "Rob stands for Robot."

"Please, Rick—forget that." The squinted eyes looked hurt. "They pinned that on me when I was a boy and still fool enough to show off. I was discovered by a Martian scientific expedition. They gave me a lot of idiotic tests and wanted to take me back to New Heidelberg like a specimen in a jar. One psychologist wrote a paper about me—with a long German title that means something about ray-born mutant spaceman."

Little McGee was kicking unhappily at the pavement.

"Please forget it, Rick." His low voice was suddenly bitter. "I know I'm different. Not smarter—I can see I'm not as smart as some people. Just different. And it's pretty lonely." He coughed and looked away. "Go ahead and call me Rob, but please forget what it means."

"I'm sorry," Rick said awkwardly. "I mean—if that's the way you feel about it. But I think you should be proud."

Turning back toward the rust-stained tug, Rob McGee gently changed the subject. "If we're going to leave by midnight we've got things to do. We need supplies and the separator-manifold is nearly burned out—I'll have to install a new one."

But Rick wasn't listening. He was staring across the bulge of the field at a flame-colored head. For Karen Hood had stopped her little blue electric runabout against the ropes beyond the tall black cruiser. She was devastating in green sports pajamas, and Captain Anders was kissing her good-by.

"Eh?" Rick muttered bleakly. "What did you say?"

## V.

They went aboard the *Good-by Jane*, and Rob McGee made a list of supplies and repairs for the ship. "Put down a portable prospecting drill," Rick told him. "With tantalum and oxyhydrogen heads. And a peegee finder, too."

McGee's squinted stare expressed the skep-

ticism of the old hard-rock man for that new-fangled paragravity divining rod, but he put it on the list. Rick took the order to the Interplanet office at the edge of the field and wrote a check that used up the most of his savings. He sent a mechanic to help repair the engine.

Now the cruiser had gone and he met Karen whipping her blue runabout away from the field. Rick stopped and waved an awkward hand, but she drove on by him with only a stiff little nod. It was hard to put her hurt, accusing face out of his mind.

His own dirigible armor was hanging in the field locker room. He climbed into the clumsy-seeming steel-and-lead-and-plastic gear and drove it like a tiny peegee ship into the open air lock of the tug. Emerging awkwardly through the zipper front he saw the sick face of Rob McGee.

"We aren't going anywhere." McGee made a tired little shrug and his soft voice held bitterness. "The Interplanet truck didn't deliver the new manifold, and now the night clerk says it's out of stock. It's just another run-around, like they gave us when we tried to buy the terraforming unit for Freedonia."

Rick's blue eyes blazed with wrath.

"But they won't get away with it—not this time."

He strode across the field to the impressive new white-glass building of the Jovian trading monopoly. The sleepy night man seemed to speak no English. He pointed to an empty shelf when Rick drew a picture of the manifold and explained in passionate Russian.

Repairs for such obsolete ships were very expensive, declared the fat blond man in the office of the Martian corporation, but he knew of a manifold that could be bought privately for two thousand dollars. He ducked an impulsive left hook and Rick went across to the Venusian company.

The slant-eyed Venusian night clerk had no manifolds to fit the *Good-by Jane*. But he remembered an occasion in the Lotus Flower Bar when Rick had helped to settle a rather bloody discussion of race with a gang of sunburned Aryans from the Martian Embassy; and he confided that his stock had just been purchased by an Interplanet clerk.

"Fresh lot three-four days," the little yellow man said cheerfully. "Hold one special for you, please?"

"Thanks, but that would be too late."

Rick climbed heavily back over the curve of the terraformed hill with his anger ebbing into bleak despondency. This seemed to him a remarkably petty and ignoble abuse of Interplanet's ancient might. But he could think of nothing more to do about it.

He found Karen Hood's small blue car parked against a yellow barrier. In a black evening gown

that took his breath she was stumbling across the field beyond, carrying a heavy, angular package. He overtook her just as she heaved it into the open air lock of the *Good-by Jane*.

The setting sun was burning in her hair—it was almost midnight, Mandate time. A broad streak of grease made a black wound across the white flesh of her shoulder. Her flushed and breathless loveliness struck Rick like a meteor.

"Swell of you to come," he called eagerly. "I wanted so much to see you, Kay—"

She swung to face him, leaning back against the huge rusty springs and levers of the ground gear. He was about to take her long body in his arms.

"There!" she whispered wrathfully. "Take it!"

Anger was becoming to her. It colored her high-cheeked face and turned her eyes a bright, frosty blue. Rick was staring in stupid admiration with a choking ache in his throat. She jerked an impatient thumb at the bulky package.

"Your damn manifold."

"Kay!" Rick felt as if a vacuum had drawn the pain out of his throat. Tears stung his eyes, and he stepped quickly toward her. "Kay—you're wonderful."

"Don't thank me." Her brittle voice stopped him, gasping. "I believe you ordered a manifold from Interplanet. Now it has been delivered. And Paul isn't to blame—he doesn't need to use such tricks; his orders must have been misunderstood."

He caught her arm. "Kay, please—"

"You have it." He saw the angry glitter of her tears. "Take it and go."

She twisted savagely against his grasping arm but Rick was strong enough to hold her. He dropped his other arm to pen her against the rusted steel. He gulped to speak, and his voice came rough and incoherent:

"Please, Kay—listen. I can't go on with Interplanet, but you ought to know I love you. Please give me a chance. I must seem like a traitor, but please try to understand. It was swell of you to do this, Kay. I mean, it shows you're different from the rest. Please!"

She made no other struggle against his tall might. Relaxed against the huge bars of steel, she looked pale and lifeless. The bright flame of her hair was all incongruous. Her voice came spiritless, exhausted:

"It's no use, Rick." Very white under the velvet straps and the smear of grease, her shoulders made a bitter shrug. "I may as well tell you—tonight I promised to marry Paul whenever he comes back from that runaway rock."

The words were a blow. They numbed Rick and took his breath, and made a cold sickness in his stomach. He took away his arm and let her go. Dazed and mute, he stood staring after her.

At first she walked stiffly, with none of her old vital grace. Suddenly she ran, the black skirt flying. The blue car swept her over the curve of the hill and her bright hair was gone.

A slow and awkward giant, Rick carried the manifold up to the engine room. The old manifold had broken to gray shards when they removed it. Rob McGee had sent the mechanic home and gone to sleep in his cabin. Rick called him down to help install and test the new one. A few minutes after four they were ready to take off.

"—four hours late!" They were in the low, gray-padded pilothouse at the top of the boxlike ship; and McGee's voice came muffled from the black periscope hood as he stood at the controls.

"Which gives Captain Anders about seven hours' start." Rick grinned cheerfully. "But the first shall be last, as you didn't say!"

For a time he felt elated. He had been taking orders for too many years and it was exciting to be driving through open space on the trail of the mystery rock. He watched the gray tiny point in the dark field of the periscope until it came to stand for all the ultimate enigma of timeless space, until his gaunt frame tensed with eagerness to meet its contradictory challenge.

A gray loneliness grew upon him, however, and he had to fight a bleak depression. Karen's bright image came to urge that the expedition was expensive folly. But he made little McGee tell about the life and work of old Jim Drake. He learned to run the ship and helped in the galley, and once even offered to brew a pot of the weak bitter tea that the little spaceman drank incessantly—but that, McGee gently insisted, was an art beyond teaching.

Hopefully, he turned to the books of his father's he found on a shelf in the narrow wardroom, dealing with the seetee drift. They were two days out, and he was plowing grimly through a ponderous old speculation on the mathematically possible types of nonterrene matter when he heard the buzz of the ship's photophone.

"Tug *Good-by Jane*, of Obania." He listened to Rob McGee's soft-spoken identification. "Hello, Captain Anders. I thought you would be already out—" Silence, and then he heard a bewildered protest: "Eh? What men? . . . Injured or not, I don't know anything about them. . . . No, we certainly didn't speak you yesterday. . . . How should I know who they are? . . . All right, I'll let you talk to Drake."

Rick climbed the ladder into the square gray pilothouse. Little Rob McGee was standing with the photophone receiver in his hand. Silently, he held it out to Rick. His brown leather face had a blank expression. Wondering, Rick took the receiver.

"Drake speaking."

"H'lo, Drake, this is Captain Anders." The curt, slurred voice snapped back with no perceptible interval. That meant that Anders was somewhere within a few thousand kilometers—though the runaway was still thirty million kilometers ahead. "Where did you get those men?"

"Eh?" Rick was utterly bewildered. "What men?"

The thread of light brought him a low, sardonic chuckle.

"I don't quite get it, Drake," came the slurred pur of Anders. "But we're in firing range, you know, and I'd advise you to explain." His voice fell, cold and dangerous. "*Where did you get those men?*"

For a moment Rick couldn't answer. He listened dazedly to the whisper of cosmic interference in the photophone receiver—to the muted murmuring of the nebulae, and the far-off drumming of pulsing suns. At last he stammered awkwardly:

"I don't quite . . . I don't know what you're talking about."

"Then I'll refresh your memory." The Earthman's voice seemed hard and alert, but he didn't lose his tempered assurance. "You spoke us, twenty hours ago, when we were more than halfway out to that rock. How you got there is something I intend to find out—I still b'lieve you burn seetee in that old can!"

"Not yet!" Rick said. "And we didn't speak you."

"You've forgotten that you called us?" The brittle voice was sarcastic. "You've forgotten that we decelerated and gave you a pipe, and took off eighteen injured men because you didn't have hospital facilities? And you don't remember where you found them?"

"No," Rick protested sharply. "We didn't!"

Half a minute passed and there was only the dry whisper of the stars. Then the voice of Anders came again, oddly hesitant, and Rick knew he was afraid.

"Drake—who are those men?"

"I don't know," Rick said patiently. "We don't know anything about them."

"Say what you please, Drake." Anders clung to his old self-possession. "I'm not going to arrest you now. We've not time to decelerate again, and I'm giving you the benefit of the doubt. But I warn you that I have full military authority and I intend to use it. Please think what you're doing, Drake. It would be painful to your friends at Pallasport to learn you were on Pallas IV."

Little Rob McGee took the dead receiver and replaced it on the hook. His rayburned face asked a mute, bewildered question. Rick Drake shook his head.

"Either Anders has gone crazy—which isn't



very likely—or else there's a reasonable facsimile of the *Jane* floating around between here and the runaway with our doubles aboard." His lean face broke into a sudden brown grin. "Must have been your double that called me at Pallasport!"

"Please, Rick," protested McGee, "this is nothing to joke about. We've got too much at stake. Think of your father, and all he hopes to do with seetee. We can't let Anders send us all to the prison rock."

"No," Rick agreed very soberly, "that wouldn't be a joke."

Silence hung in the cramped gray room, disturbed only by the muted vibration of the engine and the soft occasional click of relays in the pilot-robot. The eternal silence of space was getting on Rick's nerves. He had envied the serene calm of Rob McGee, but now the little spaceman himself seemed unquiet. He fumbled for his pipe and Rick reminded him that he had left it down in his cabin. But he didn't go after it.

"Rick, I don't like this." His squinted eyes were dark with strange foreboding. "I've lived all my life in high space and I've seen my share of mystery and wonder and terror." His voice

fell to a husky whisper. "But this is—impossible."

"It's a riddle," Rick assured him cheerfully. "I know it has an answer—some very simple and obvious fact—if we can only find it."

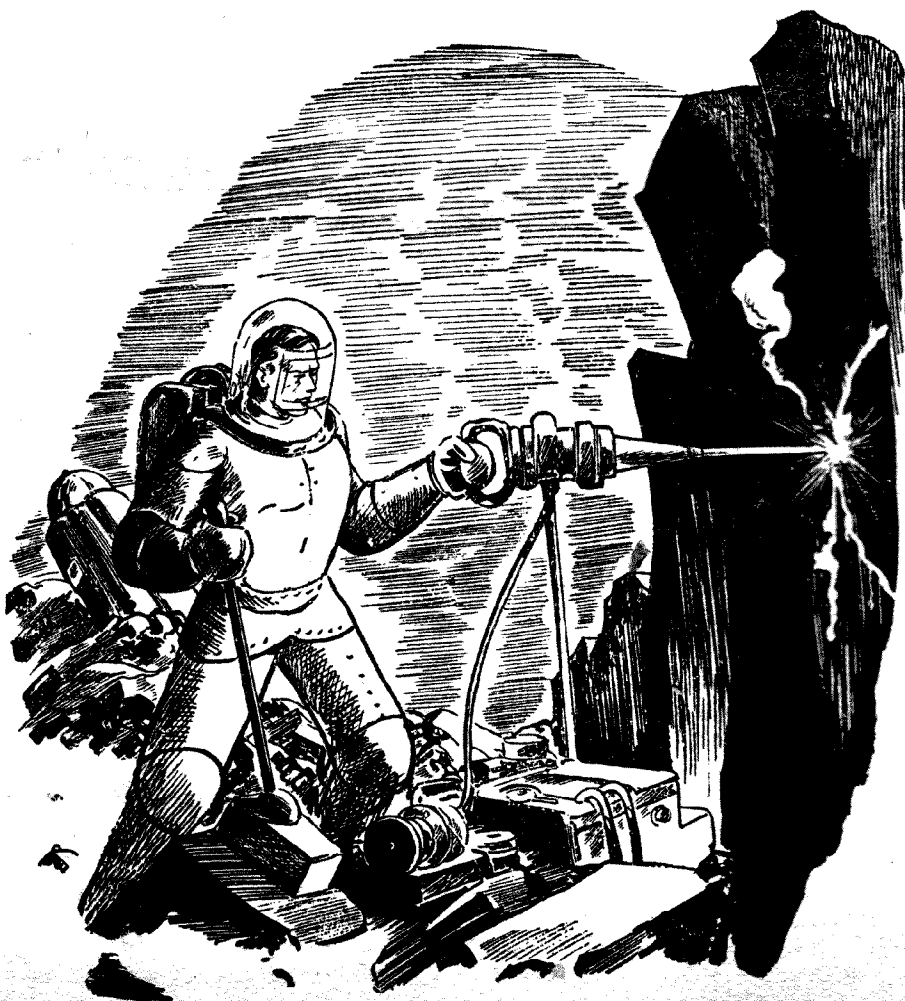
McGee looked almost ill.

"I don't like things I can't understand." His leather face twisted as he seemed to grope for words. "Because I can always *feel* the position and the speed of every rock that I can see—I know exactly what it is going to do, without thinking. Only this runaway—it doesn't fit."

His yellow head made a slow, baffled shake.

"I can't explain, but the feel of it is somehow—wrong. Besides, there's this call I didn't make, and now Anders is talking about these men we never saw. But the feel of the rock is the worst. I can't quite explain, but it hurts."

Rick nodded slowly. He thought he understood. McGee's remarkable perception was far more delicate than any sense of his own. Like any other fine instrument, it was easily disturbed by shock. "But let's carry on, Cap'n Rob." He attempted an encouraging grin. "Anders seems as much upset as we are."



## VI.

Three days later—by the ship's calendar-chronometer, it was seven on the morning of March 30th—they were less than half a million kilometers from the runaway, decelerating. Standing with his head in the periscope hood, eagerly studying the dark angular rock, Rick didn't hear the photophone. McGee tapped his shoulder and gave him the receiver.

"H'lo, Drake." He heard the clipped, careless voice of Anders, imperturbed as ever. "S'pose you don't remember those men, yet? Well, that doesn't matter now. But since your memories are so short I must remind you not to get too near that rock. I'm setting up a military sphere around it. If you approach within a hundred kilometers the gunners will have orders to fire. Is that clear?"

"I suppose so," Rick said.

"Don't forget it." Then Anders took a friendly tone again. "I'm not unreasonable, Drake. I like you, personally, and I understand your asterite sympathies. I admit frankly that I have no more than suspicion and circumstantial evidence against you, so far. And I know that you have very influential friends in the Mandate government. If you are willing to surrender and explain the things you've done, you can be sure of a pardon. What y' say?"

"No," Rick said desperately. "I mean, I've done nothing to explain."

"As you please." Anders dropped the sympathetic role. "But watch your step."

The receiver clicked and Rick hung it up.

McGee whispered uneasily, "What did he want?"

"Information," Rick said. "Somehow he thinks we know a lot more about the rock than we do. I believe he's afraid of us. I think he was trying to bluff us into talking."

"Maybe." McGee looked uncomfortable. "But asterites have been arrested—and sentenced to life on Pallas IV—on no more than suspicion and circumstantial evidence."

Rick said nothing. For a time the only sound in the low gray room was the dull, irregular click of the pilot-robot. The stillness of space became a smothering oppression. Rick caught himself tapping at the calculator keys just to make a noise.

At last McGee shuffled down the ladder to make himself some tea, and Rick turned back to the periscope. He found the blue and orange stern lights of the cruiser. They dimmed among the steady diamond stars ahead and presently he lost them.

Hour by hour the runaway grew until it became a dark, angular boulder, spinning slowly in its flight through the frost-pointed chasm of eye-aching blackness. Not round at all, it was jaggedly

hewn by accidental fracture planes. As they drew nearer, the gray color of it separated into dark volcanic blues and the red and black of iron, splotched with brilliant ochers.

By late afternoon, Mandate time, deceleration had dropped them without five hundred kilometers of its rugged and swarthy enigma. Rick found the red and green bow lights of the cruiser beyond it, sliding down a spiral.

"What now?" inquired Rob McGee.

"Let's swing into an orbit—say two hundred kilometers out," Rick suggested. "That's outside the military sphere and near enough so we can see what goes on." He tried not to seem discouraged. "That's all that we can do."

With a silent, vaguely apprehensive nod, McGee stood to the controls. Clearly, he had lost his relish for the adventure. Still unable to explain exactly what violated his sensitive perception, he seemed acutely miserable.

"Do you mind?" Rick asked uncertainly, wondering if he wanted to turn back.

"It still feels wrong." McGee's voice came slow and faint from the muffling hood. "It makes my head hurt. But I'll stay with you so long as you think we've got a chance to beat Anders to the answer."

Half an hour later they were hanging two hundred kilometers to Sunward of the runaway. With his head in the periscope hood, Rick watched the somber-colored rock. The Sun struck its knife-sharp peaks and ridges with a painful glare that drowned the stars beyond. Shadows black as space itself clung mysterious in every airless hollow, and crawled and dwindled as the rock turned, and always clotted thick again.

The riddle of it held him fascinated. Every asteroid had its own spell of wonder—a tiny world, complete, unchanged by erosion or decay since the dawn of human knowledge, untrodden since its cataclysmic birth. The contraterrene meteors, invaders from the far unknown beyond, held the strong allure of bright and sudden danger. But this one dark little world was now a mystery beyond all others.

Unaccountably it had flared into a nova and quenched itself again. It had changed its shape inexplicably. It fled from the drawing Sun. In Rick's eager, baffled mind, it had come to stand for all the dark illimitable challenge of the Universe to the young, audacious race of spatial engineers.

"There!" He caught his breath sharply. "I see . . . I thought I saw something moving. It was tiny as a man in dirigible armor. The Sun was bright on it for a moment, but now it has gone back into the shadow."

Reluctantly, he yielded the periscope to Rob McGee, who found nothing. "It couldn't have

been a man—not on a seetee rock,” he protested gently. “And the cruiser is still forty-one kilometers beyond the rock.”

He gave back the instrument. Adjusting his eyes from the dazzle of the rock, Rick saw the double star, red-and-green, swimming in the dark infinity. To his normal eyes it looked as far away as any binary—or as near. A yellow flash swallowed it.

“They’re firing!” Rick was startled. “But we’re outside their military sphere.”

“A test shot, probably,” McGee said calmly. “If it is, the flash should come in about twelve seconds. Watch for it.” He didn’t need to look at the chronometer. “Now!”

Contact, Rick knew, was the only test for contraterrene matter, and a gun was usually the most convenient testing instrument. If a test shell exploded against an uncharted rock like a shipload of tritonite, then the rock needed marking with a seetee blinker. Watching intently, he reported: “No flash!”

“Maybe,” McGee suggested cautiously, “the shot struck the other side.”

For a time he merely watched. He lost the cruiser’s light, and eye fatigue made the field a flat black curtain. Turning in slow motion, the rock hung close against it. Jagged peaks struck back the Sun with a sullen, dazzling glare. Shadows flowed and shifted, like pools of viscid ink.

“Look—do you see that?” He pushed McGee at the periscope. “In that hollow at the west limb—below the V-shaped blue patch—just coming out of the shadow—what is it?”

“I don’t see it,” protested McGee. “Wait—it looks like a ship!”

“It is a ship—or the wreck of one!” Rick exclaimed. “That means the rock isn’t seetee, after all! That must have been changed, too—along with everything else that happened to it.”

He restrained a fierce impulse to drag Rob McGee away from the instrument. At last he stepped aside, and Rick thrust his head back into the hood. Now the rock’s rotation had brought the object fully out of the black shadow lake. Lying in a crater-pocked, ocher-yellow hollow, it was unmistakably a wrecked spaceship. Its lean black hull was torn and battered, and now apparently veiled with a thin cloud of condensing vapor.

“It’s still smoking,” he whispered, breathless. “And I think it has the outline of an M-4 cruiser. Has Anders—crashed?”

“No,” said Rob McGee, “because I hear him trying to speak the wreck.”

With tense fingers Rick swung the periscope away from the glaring asteroid. In a moment he could see the stars again. He found the unsteady flicker of the Guard cruiser’s photophone, and he could hear the tiny voice in McGee’s receiver:

“H’lo, cruiser aground.” It was the brittle voice of Captain Anders, rising with impatience. “Can you identify yourself? Can you hear me? Make any signal if you hear me. . . . H’lo, cruiser aground! Can you identify—”

The wreck answered then but not with any friendly signal. One of its flat turrets was crumpled underneath, but the other moved. A long spatial rifle pointed its black finger at that flickering light and the wreck was covered with a sheet of reddish incandescence.

With his face against the lenses, Rick had felt so near that it almost surprised him not to hear the gun. But there was only the thin voice of Anders in the photophone receiver, sharp and angry now.

“You’re firing on us! What’s the meaning of this? Piracy and treason, I s’pose? A damned asterite plot to work seetee and rebel against the Mandate? Please inform Richard Drake that traitors should be clever. Your ship is obviously a captured Guard cruiser. I demand your immediate surrender or we’ll return the fire.”

The answer was a second shot.

The tight voice of Anders abruptly ceased. Searching again, Rick couldn’t find the cruiser’s lights. For one dazed instant he thought it must have been hit. Then he realized that Anders was merely taking advantage of his black camouflage.

For the ship at space began firing. It was invisible between shots, though kylstron beams might have followed it. Rick knew that it was twisting through complicated dodging maneuvers, for each sudden mushroom of fading yellow flame came from a new position.

Against the ocher hollow the wreck made a black bull’s-eye. The single gun in the uppermost turret, however, continued the unequal battle. The first shots from space, Rick thought, fell strangely wild. But Anders’ gunners soon found the range and the yellow hollow became an erupting crater of dust and flame.

The cruiser at space fired twenty salvos. The wreck ceased to reply. When the smoke and dust of battle cleared, however, Rick was surprised to see that it was standing upright on its ground gear.

Its crew, no doubt, had made a frantic effort to get it away to the safety of open space. That effort had failed; yet, so far as he could see, it had survived the bombardment with no new damage. In fact it looked more spaceworthy than he had first thought. The photophone upon its black tapered snout began flickering furiously.

“Listen!” Rick urged breathlessly. “See if you can tell who they are.”

McGee listened. An expression of dull bewilderment came over his square, deep-furrowed face. With a little shrug of half-frightened bafflement he handed the receiver to Rick.

"See if you can understand 'em!"

Rick took the receiver—and felt a chilly spine-tlingling.

"Sounds human—almost human—but there's not a word I know." His bronze head shook in slow, dazed wonderment. "I can understand just enough Russian and German and Chinese so I know it's none of them."

"This is getting me, Rick." McGee took the receiver back and listened with a numbed expression. His voice was sick. "This is all insane. What explanation is possible?"

"We've come to find out."

Avoiding the terror brooding in McGee's squinted eyes, Rick turned back to the periscope to watch the grounded cruiser. The photophone light continued to flicker at brief intervals with that weirdly semihuman voice. The ship at space replied, for McGee picked up the tight voice of Anders:

"Better speak English if you want to surrender."

Rick reported presently: "I see figures coming out of the air lock." His voice was slow and puzzled. "Men in regulation armor, maybe. But there's something . . . something wrong about them. It's so far you can't quite make them out, not even with the highest power. But there's something—queer." McGee was beside him, anxious for a look, but he said: "They're gone now. They went over the south rim in a hurry."

He gave McGee a turn at the instrument, but those minute, puzzling figures failed to come back. In less than an hour the rock's rapid rotation had drowned the ship once more in ink-black shadow.

"Here!" McGee's soft, breathless voice was muffled in the black hood. "It's Anders, coming in to land. All the lights are out again, but you can see the ship against the rock. He must be trying a surprise approach on the blind side of the enemy."

Rick mastered his impatience until at last McGee stepped aside. He found the cruiser dropping across the field, a black silhouette against that dark-hued, sullen landscape. Then its shadow came across the rim of the airless rock, sharp and black as the ship itself.

The cruiser dropped lower. Ship and shadow raced together as it approached the glaring surface. Then Rick caught a gasping breath and tried not to shudder to the icy chill of fear. Because the ship and the shadow came together—and vanished!

## VII.

Little Rob McGee made a shocked protest. "You're mistaken, Rick—you must be mistaken! Perhaps it's some trick of the lenses. We're two hundred kilometers away, remember, and the cruiser's painted to make it hard to see. Six

thousand tons of fighting steel can't just disappear."

"But that's what happened," Rick insisted. "I know it was something more than just illusion. Because the ship was clear and black against the glare of the rock. I'm certain . . . anyhow, almost certain—"

His voice trailed into a vague abyss of uneasy wonderment. All the sanity-jolting riddles about this contradictory planetoid were condensing into a sinister threat. Rick Drake didn't like to say so, but he was afraid.

Anders had believed that he was attacking a nest of asterite pirates or rebels. If he had been altogether wrong, then who was the enemy? The subtle wrongness of that unintelligible voice suggested something no more than pseudohuman.

And what had caused the cruiser to vanish? Did the crew of that disabled vessel possess some unknown weapon, efficient enough to annihilate a modern fighting ship without even a flash of light?

Rick looked at Rob McGee. He seemed gray and ill, with a wet glisten of nervous perspiration on his face. Better not to speak to him about semihuman contraterrene monsters and their problematic weapons.

"Maybe I was wrong." Rick tried not to seem alarmed. "Maybe it dropped into some shadow, or slipped back out to space. Will you try the photophone and see if Anders answers?"

Rick tried the photophone but Anders didn't answer.

Rick kept his aching eyes against the periscope. He couldn't find the cruiser's lights. The rock turned again and black shadows flowed. But the cruiser didn't come to view.

"Here's that yellow hollow," he whispered at last. "The hollow where the wreck was—just coming out of the shadow." His breath exhaled slowly. "And it's gone, too!"

"They must have got it repaired," McGee suggested. "It wasn't so badly damaged as we first thought. They took off from the night side—they wouldn't want to risk being caught on the ground again."

"Probably." Rick nodded, somehow not quite convinced.

The rock plunged on toward the limits of the system. They followed, hanging two hundred kilometers behind it, a bare four seconds. McGee called into the photophone until his throat was dry, but the only answer was the eternal voiceless whisper of the stars.

Rick stared into the periscope until his burning eyes saw double. Twice he thought he glimpsed some tiny figure moving. It might have been a man in dirigible armor—or only a trick of his tortured vision.

That night was an age of anxious strain. Little

McGee went down to the galley to brew his tea. Unwillingly, Rick left the periscope to gulp a hurried snack. Exhaustion forced them each to sleep a few hours while the other watched.

Next day had no ending. The rock slowly turned ahead, but its darkly mottled face showed nothing new. The vanished ships didn't come back. McGee called Anders on the photophone, but only the stars replied.

It was April 1st—1:04, Mandate time—that Rick decided to attempt a landing. They both had slept a little more, but McGee's squinted eyes were bloodshot with exhaustion. He looked pale and ill, and Rick knew that he wasn't anxious to invade the military sphere that Anders had declared. But he stood to the controls without a word to bring them down.

No challenge met them.

"Dead as any seetee rock," whispered Rob McGee. They were circling again, three kilometers aloft. His voice was tight and dry. "We had better make a test."

And Rick took his heavy, antiquated space pistol—the only sort of weapon that an asterite could get license to carry under the Mandate. He put on his stiff dirigible armor and went out through the air lock. Clinging to the safety rail he stared down through his face plate.

His mind knew the size and the distance of the rock, dark-mottled and yet dazzling against the black of space. Because he lacked McGee's perception, however, it seemed to him at one moment a bright pebble that he could take in his glove, and the next a mighty planet of incredible mountains.

He pointed McGee's old revolver at a broad patch of blue ground and squeezed the trigger. It jerked in his hand and belched expanding smoke, but made no sound. He counted three seconds, waiting uneasily for the bullet to explode like a ton of tritonite.

But there was no explosion. He emptied the cylinder, peppering the tiny plain. There was no flash of annihilated matter. He went back aboard and mounted the ladder like a silver-armored giant.

"O. K., Cap'n Rob," he said through the open face plate. "Not even a spark."

"It was seetee," insisted McGee, still uneasy.

"But not any more." Rick was eager now. "Set her down—there's a little valley at the south pole where we'll be hidden in the shadow if Anders comes back again—or the ship he fought."

McGee nodded mutely. As if heavy with misgivings, he turned slowly back to the periscope and the controls below it. But Rick's voice quickened with a half-suppressed excitement.

"That blue ground is interesting—especially where it's near outcropping iron. According to

what the old professors used to say, that was Nature's way of forming carbon crystals—if carbon happened to be present. I'm going to try the finder—"

McGee didn't answer. The black hood covered his face and Rick supposed that his silence was due to the mistrust of the old hard-rock man for academic theories and for all such modern gadgets as the paragravity finder.

Rick himself sensed nothing unusual. Shut in padded walls of lead and steel, there was nothing he could see. He felt the tug bump and sway on the ground gear, and lurched a little to the added weight as McGee snapped on the peegee anchor.

"We're down," said McGee.

It was a choking whisper. He stumbled back out of the hood, and Rick saw that his face was a wet gray mask. His hands came up to his temples in a gesture of pain. Rick caught him as he fell.

"What . . . what is it, Cap'n Rob?"

But he was unconscious. Rick carried him down to his tiny cabin where his few belongings were all arranged in a fussy order and laid him on the narrow berth. Breath and pulse were slow and his skin felt damp and cold.

Rick had taken one semester of spatial medicine, back at Panama City; but that, like his prospecting, was academic and untried. Obviously, McGee was suffering from something more serious and unusual than a simple attack of spaceman's colic, but he had no idea what to do.

McGee's faint whisper relieved him vastly:

"I'm O. K., Rick." The sick, perspiring face tried to grin. "Didn't mean to fold up on you. Go ahead and find your diamond mine."

"You're pretty sick." Rick was disturbed and incoherent. "I mean I think we ought to do something. What do you think's the matter?"

"My head," whispered McGee. "When we landed it split wide open. I don't know why—except everything is spinning and confused and terribly wrong." He drew a long, ragged breath. "The worst part—I don't know what time it is."

Rick looked automatically at the dial on the back of his armored wrist before he dimly realized what that simple statement must mean for Rob McGee. Nothing was wrong with the little chronometer.

"It's one forty—" He caught his breath. "Oh I see . . . maybe we should take off again."

"No, I'm not that bad." McGee managed to sit up in protest though he was tense and white. "Get me a couple of aspirins—and go out and try your finder."

Rick yielded, for that glimpse of blue clay and outcropping iron had set a kind of fever in him. Men had made a few flawed imperfect diamond



in long centuries of effort. But no man could wait the million years or so that it took to form a perfect tuning crystal—and a handful of them would be enough to buy achievement of his father's old dream.

"I'll hurry." He found aspirins. McGee gulped them and lay weakly back on the pillow. He seemed barely conscious. Yet, as Rick hastily hooked up the peegee finder on the table in the adjoining wardroom he could feel the stubborn skepticism beneath that gray mask of suffering.

The finder made use of the same selective characteristic of the paragravity field that separated the power isotope from uranium. Rick connected the compact batteries, adjusted the vernier knobs. Under its glass bell the sensitive needle spun uncertainly until he found the exact frequency of crystalline carbon. Then it dipped to point confidently downward.

Rick restrained a whoop of joy. He read the bearings, moved the finder to the other end of the wardroom to get a second reading, and started to plot a triangulation. His eager face abruptly fell.

"I'd better take it outside," he told McGee with a sheepish grin. "The thing has discovered the tuning diamond in our main drive unit."

"Go ahead." McGee's voice seemed a little stronger. "I'm feeling better now."

Rick went out through the air lock again. It took both his armored hands to operate the finder and he drove the flying armor with his teeth on the padded helmet stick. A tiny spaceship, of steel and lead and sealing plastic, with its own peegee drive, the suit lifted him toward the nearest Sun-struck peak.

He hovered in its icy shadow to survey the stark landscape beyond. The small hot Sun struck every point with blistering fire and the glare killed all the stars. Every shadow was a pool of darkness, utterly black as the sky. The whole rock was desolate, riven, terrible with every mark of planet-bursting cataclysm—yet, to Rick, it was smiling with incredible promise.

For he saw masses of hard blue clay, streaked with ocher and sullen red. He saw the dark scars of volcanic fire and a black outcrop of living iron. Yes, this must once have been a natural crucible.

This was diamond ground!

His hands stiff and awkward in the armored gloves, he set up the finder again. The little needle spun uncertainly and refused to come to rest. Cold with disappointment, he remembered the dusty voice of his old professor of spatial petrology:

"All those things are merely indications. Sometimes there was no free carbon present. Sometimes the temperature and the pressure were not

exactly right, through the ages that it takes, and all you get is graphite."

But he went on, stubbornly. He kept cautiously to the night side of the rock, but its quick rotation brought the whole surface to him. He must have stopped to try the finder a hundred times before the needle came to rest.

Then it pointed at a gray-black wall of living iron, splotted and stained with reddish oxides. He took a dozen readings and plotted them with anxious haste. The point of intersection lay nearly two meters beyond the face of the cliff.

With the stub of a fluorescent pencil he marked the place to set the drill. His fingers trembled so that he could hardly write, but he scrawled a blue-glowing notice:

Mining Claim

Richard Drake and Rob McGee

April 1, 2191

He soared eagerly back to tell Rob McGee and couldn't find the *Good-by Jane*. It was gone from the hollow at the pole! For a moment he felt terribly bewildered and afraid. Even the shape of the hollow had changed. He was caught in a new trap of the enigmatic rock.

He was sick and utterly lost. But that was impossible, he told himself grimly; no fool could lose himself on a world not two kilometers through. He looked resolutely away at the stars, and suddenly his orientation shifted again. He had come to the north pole of the rock instead of the south.

A stupid blunder. He steered the armor south again and passed the shallow yellow hollow where the crippled ship had been with its unknown crew, and found the *Good-by Jane* safe in the pit of darkness where he had left it.

Gratefully he dropped toward the open lock. But still he couldn't shake off an uncomfortable turned-around feeling. The rock seemed to be rotating in the wrong direction now. He thought that he had begun to sense something of the wrongness about it that made McGee so ill—and he wondered uneasily if he could find the claim again.

McGee was still unable to leave his berth though he insisted that he felt a little better. He listened silently to Rick's breathless story, but Rick could see that he was still skeptical about the peegee finder.

"Of course, it may be graphite," Rick admitted. "That draws the needle, too, on the same setting, only not so strongly. It would take something like a ton of graphite to cause that much deflection, but only a few kilograms of diamonds. And this is diamond ground."

He hesitated.

"I marked the claim, Cap'n Rob. With only the

battery drill it would take me about a day to cut through two meters of iron. If you aren't able to wait I'll take you home to Obania and come back and—"

"Nonsense!" McGee sat up in a jerky effort to discount his illness. "This rock is flying out of the System, remember—and we have only nine days left to pay the taxes on Freedonia. If you think you've got diamonds, mine 'em while you can. I'm not going to die."

Rick took time to brew him a pot of tea—which he wasn't able to drink, though he said it wasn't bad. And Rick himself gulped down a soapy yellow bar of a food-formula, trade-named Ambrosia, supposed to digest without giving the eater spaceman's colic.

He unpacked the drill. With a mass of nearly two tons it was still portable here. There were two sets of batteries. He set one to charging on the ship's generator and hooked the other to the oxyhydrogen cutter-head. Towing the machine like an ant with some disproportionate burden, he set out to look for the claim.

At first he couldn't find it. So long as he took his direction from the brilliant stars he couldn't shake off the uneasy sense of being lost. But as soon as he ventured upon the day side of the rock its glare put out the guiding stars, and his orientation shifted, and he recognized the blue plain ahead.

Just beyond the line of shadow he found his claim notice shining blue on the black iron cliff. He towed the drill into place beside his mark and welded the bedplate to the iron, and set the oxyhydrogen head to cut a forty-centimeter core.

By the time the flames bit into the stubborn iron the brief night was almost gone. Afraid of being seen from space, he found a loose boulder whose sluggish mass must have been a hundred tons, and towed it laboriously to a place where its shadow would hide the drill.

Then he had only to watch the machine. When he quit moving about, a flood of tiredness came over him. In spite of his ravening impatience it was hard to keep awake. Yet he dared not sleep, lest the jet get out of adjustment and let molten iron freeze the drill.

In six hours he cut a little more than a meter. The batteries were exhausted. He towed them back to the ship and set them to charging, and brought back the other set—this time, careful to watch landmarks, he got back without difficulty.

He had planned to take out a core extending half a meter beyond the point indicated by the finder. The diamonds, he hoped, would be embedded in the iron; and they would remain when it was dissolved away with acid. Just before the gauge showed two meters, however, the core broke loose.

It wasn't necessary to use the section head. He

cut the jets and removed the core. The end of it was dark and irregular and he saw no gleam of diamond. Disappointment came over him, a wave of slow, cold sickness.

Stiff and awkward, he stooped to let his helmet light shine into the bore. He could see something black and dusty. The natural crucible held carbon, no doubt; but some factor had been wrong. It was only a pocket of worthless graphite.

He groped mechanically for a long cleaning tool and reached to scrape out its ladle full of that brittle dusty stuff. He stirred it with a stiff metal finger—and the breath went out of him.

For the black matrix powdered away from hard smooth faces. Dark empty crystals drank the rays of space and filled with rich fluorescent splendor. Rick turned cold and he could hardly breathe again.

Diamonds! He rubbed them out of the dark, brittle matrix where they must have grown through unguessed æons. None was very large. A few were flawed. Others, cubes and a few with more than eight faces, were valuable only as gems. But fully half of them, he estimated, were perfect octahedral tuning crystals—diamonds too precious for jewels!

Careful not to lose them through sudden movement—for the rock's gravity was too slight to hold them safely in his palm—he dropped them into a stout little ore sack. Men had tried, since Moissan's time, but only the iron heart of a living world could shape such stones as these.

Suddenly, Rick wasn't awkward any longer. Careful and deliberate, he reached again with the long steel spoon for another handful of black powder that shattered into incredible fire. He filled the first little bag and tied it securely to his belt and found another.

Diamonds by the sack! The cavity was larger than his helmet. It filled three small bags. Allowing for the bulk of the worthless matrix and the flawed and misshaped stones, he thought there must be three or four kilograms of perfect terraformer crystals, worth eight thousand dollars a gram.

Staggering wealth—but Rick, rather to his own surprise, didn't feel staggered at all. He had accepted the common idea that sudden millions brought a crazed intoxication. But now he found himself sober and calm, grave with new responsibility, strong with new confidence.

In this victorious moment, it seemed to Rick, he was really growing up. He had been torn between two conflicting worlds, at home in neither of them. But now they both were ended, it came to him; and he was helping build a new world on their ruins.

For these diamonds would be the key to unlock contraterrene matter. They would pay the taxes



on Freedonia and buy equipment for the seetee shop. If shrewdly spent they might even purchase immunity from the Mandate government—Rick had begun to consider himself a political realist.

He glanced at the timepiece at his wrist and felt a little startled to see that midnight had passed. Already it was April 2nd. They had only eight days left to get back to Pallasport, and sell diamonds enough to save Freedonia. Time enough—but none to spare.

With a cautious eye to spaceward he scraped the last dusty diamonds from their womb of iron and tied them in the last sack. He hastily dismounted the drill and towed it back across the night face of the rock toward the hidden ship.

In the wan starlight it seemed just as he had left it. The air lock was still open. He got the drill back aboard and slid gratefully out of his

stiff, confining armor. It was good to feel the ship's paragravity again. The normal air pressure eased a dull discomfort in his middle. He was ravenously hungry.

"Cap'n Rob!" His eager voice pealed up the ladder well. "I've got the diamonds—kilograms of them! We can take right off. We'll be back to Pallas in plenty of time—"

The stillness was suddenly ominous. Alarm sank cold talons into his throat. Clutching the three precious little bags by the strings, he clambered apprehensively up the narrow ladder shaft.

They were waiting for him in the wardroom.

## VIII.

They had made the silence. One stood behind the table, and one was on his knees, and one stood in the galley door. Their big automatic guns

all were pointing at the ladder, ready for him. Dazed and stupid, Rick spelled out the white-stenciled legend across the breast of a black steel suit, **HIGH SPACE GUARD**.

"H'lo, Drake." The slurred brisk voice of Captain Anders came out of Rob McGee's silent cabin. "Vise you not to make any fuss—my men will shoot to kill. Just stand where you are and let me see your diamonds."

Rick Drake had always enjoyed a fight. There was elation and escape in the hard game of swiftly traded blows. Now he caught his breath and crouched and weighed the diamonds for a club. But he saw he had no chance before those ready guns and he let the voice of Anders stop him:

"I wouldn't, Drake—they'll cut you to cat meat."

He let his arm relax and whispered to a sudden fear:

"Captain McGee . . . what have you done to him?"

"Sleep," said the cool and careless voice of Anders. "We didn't want to take the chance that he would warn you, so I gave him twenty milligrams of ametine. He'll wake up soon enough."

"He was already ill!" Rick flared. "You shouldn't have—"

Impulsively, he thrust toward the tall, black-armored giant in the doorway, but Anders stopped him with the quiet gesture of a gun—and Rick saw that it was McGee's old space pistol.

"Keep your head," Anders warned. "There's nothing you can do. Leroux, take his bags."

The kneeling man rose alertly and snatched the three small bags from his fingers. Anders untied one of them and lifted out a handful of black dust and frozen light. In the frame of the black helmet his handsome face went stiff with awe.

"Kilograms of diamonds," he whispered. "Millions—so that was your game!"

A covert glance told Rick that the man behind the table and the man in the galley doorway still had their eyes and their guns upon him. Anyhow, he warned himself bitterly, he couldn't fight—that would only turn suspicion into certainty.

"But they're mine." His helpless eyes followed the diamonds, and his protesting voice came hoarse and flat. "McGee's and mine. You can see our claim notice on the cliff where I dug them out. You've no right to take them."

"We don't intend to rob you." Anders tied the bag and returned it to Leroux. "But you landed here in violation of an established military sphere and I expect to develop more serious charges against you—if I can prove the connection I suspect between you and the stolen cruiser that attacked us."

He swayed ominously forward, a towering robot of black-painted steel. Rick gulped to protest, but he found no voice.

"I'm placing you under arrest," the Earthman

went on. "The courts can settle the ownership of these diamonds—and you may need them to pay your fines for treason before you go to Pallas IV. Meantime, I'm going to hold them as evidence of your activities here."

Rick's brown fists balled impotently.

"We'd nothing to do with that other ship," he bitterly insisted. "We're not guilty of any treason. I knew you had declared a military sphere—but your cruiser had been gone for more than twenty-four hours before we landed, and we assumed that it was void."

"And so it would have been." Anders turned sarcastic. "That story will save your diamonds if you can convince the judges." His sardonic brows arched. "But it's not six hours since we shelled your allies here."

Stunned, Rick could only shake his head.

"Now think up something for the judges." The Earthman's voice was biting. "I'll leave these men aboard to see you back to Pallasport. You and McGee will be confined to your quarters—"

The hollow clang of the air lock sounded up the ladder well, interrupting him. Another guardsman in black armor came clawing up the rungs in frantic haste. He slammed his face plate up.

"Captain Anders!" He was breathless, obviously frightened. "Commander Hauptman sent me, sir. It's that enemy cruiser, sir—coming back! They're calling on the photophone again—in that same language that ain't quite human! Commander Hauptman wants to know, sir—"

Even at that tense and bitter moment Rick had time to feel a grudging admiration for Captain Anders. For the schooling of aristocratic generations didn't fail him. He met this new emergency with instant hard decision.

"We must get back at once." His steel eyes flickered at Rick. "You are still under arrest, but I'll leave you to look after McGee." A black and resolute automaton, he rapped curt orders at his men: "Disable this ship. Denvers, cut the photophone. Chiang, smash the engine."

"Please!" Rick protested desperately. "There's no need for that—"

"Leroux, take the diamonds." Anders wasn't listening. "Have the warrant officer lock them in the safe and bring a receipt to me."

"Aye, sir!" The guardsman snatched the three precious bags and dropped down the ladder well. Another mounted into the pilothouse and dropped back with the photophone receiver and a length of cut wire. Rick shuddered to the brittle smash from the engine room. Anders was the last to leave.

"S'long, Drake." He waved McGee's old revolver in a mocking little gesture of farewell. But don't go 'way."

He stepped into the shaft. Below, he didn't wait

to use the economy pump. Rick heard a double clang and knew that he and McGee were left alone upon the murdered ship.

Shaking away the daze of disaster, Rick stumbled into the silent cabin. There had been no struggle, for the fussy array of pipes and cleaners and humidors was undisturbed. Under the blankets, McGee lay gray and still.

The ship was ghastly quiet. The terrible fear shook Rick that Rob McGee was dead. For he lay utterly still. His hands were stiff and cold. He had no pulse that Rick could find.

Ametine—Rick groped through his sketchy knowledge of spatial medicine. That powerful drug, he knew, slowed metabolism vastly. The survivors in wrecks at space often took it as a last resort to stop the agony of asphyxiation and stretch their dwindling oxygen. It had saved many lives, but an overdose could kill.

He ran back to the emergency cabinet in the wardroom wall and found a stethoscope. It brought the faint slow flutter of McGee's heart—only sixteen beats a minute.

"Well, Cap'n Rob, that gives you a fair chance to wake up." In his uneasy relief, Rick spoke half aloud. "Now I'm going out to see what that mysterious enemy does to Anders—because, if anything happens to him, we're left in a pretty bad spot."

The wan sleeper didn't move.

Rick went heavily down the ladder well. One glance, as he passed the engine room, showed him that the brittle refractory shell of the separator-manifold had been smashed beyond repair.

"No, Anders," he muttered bitterly, "we won't go 'way!"

He thrust his tired limbs back into the cramping stiffness of the armor, sealed it, started the air unit and pushed wearily out through the air lock. Anders and his men were gone beyond the near starlit horizon. He launched out upon a cautious search for their cruiser.

Drugged with shock and fatigue, Rick had to fight a sense of baffled defeat. The perplexing riddles of the runaway asteroid had come to seem a fantastic, deadly web. The rock rewarded every human effort, he thought, with inexplicable frustration.

He had little hope of ever recovering the diamonds. Anders himself seemed honest enough—genuinely convinced that he was implicated in some treasonable cabal—but Rick knew that such a tempting prize would never escape the clutches of the Mandate bureaucrats.

Now, however, the stake was more than diamonds.

His mind sorted bits of the puzzle in desperate search for a common denominator. That novalike flash that turned a contraterrene rock into this

one. That photophone call that Rob McGee hadn't made, with its hint of a fortune waiting here—the diamonds, of course!

But what of the eighteen injured men? The enemy cruiser? The not-quite-human voices? What had caused the Guard cruiser to vanish and return—when Anders didn't seem aware that it had been gone at all?

Rick wanted the answers desperately—because he thought they should demolish the suspicion of Anders, and recover the diamonds, and end the threat of the prison rock. But he couldn't find them.

Soaring high over the night side of the rock, he searched for the cruiser's shape by starlight. He failed to discover it. Dropping lower, he approached the Sunward face, darting cautiously from shadow to shadow. At last, hovering behind a jagged point of iron, he found the cruiser.

Beyond the peak that hid him lay a shallow hollow. The ship stood tall and black on the tiny plain of yellow clay. He glimpsed an armored man just disappearing into the air lock in its stern, the last of the crew returning aboard.

The photophone light above the tapered nose was pointed into space but he could see the flicker against its rim. The cells in his helmet picked up, faintly, a voice with a harsh Martian accent—that would be Commander Hauptman.

"Cruiser at space, identify yourself!" The voice was tight and blustering. "Our range finders can follow you in spite of your shadow paint. If you can understand English, answer—"

Rick lost that harsh, uneasy voice as his eyes followed the direction of the pointing light into space. The peak beside him hid the Sun; the dazzle of the landscape faded from his eyes and he could see the stars. But he found no flicker of an answering photophone. Instead, he saw a yellow-red flare—the flash of spatial guns.

The cruiser's officers must have seen it, too, at their periscopes. For the photophone went abruptly dark, and the vessel lurched spaceward in a hurried take-off. Its ground gear must have lifted a dozen meters above the ocher clay before the shells arrived.

A hit! He saw the instant eruption of fire and debris from the ugly pointed snout, and the ship was battered back against the rock. Then the hollow became a fantastic inferno of dust and smoke and lurid flame.

Rick lay flat behind the ledge of iron to protect himself from flying splinters. Unchecked by air or gravity, the cloud of dust and expanding vapor made a thin pale veil across the stars. He could feel the shuddering of the iron, but there was no sound.

He had thought he was out of danger. But the last salvo from space went oddly wild, so that one



shell burst far behind him. Splinters thudded against his armor. He listened for the deadly hiss of escaping air, but the tough steel had held.

Now the flash of guns had ceased in space, but Rick saw the fitful gleam of a ship's photophone. He caught it in his helmet receiver—and shivered to its strangeness for it was that same unintelligible and scarcely human voice that he had heard before.

He crept back to where he could see the Guard cruiser. Amid deep shell craters in the yellow clay it lay battered and helpless on its side. At least three direct hits had pierced the black hull. Air escaping from an ugly hole amidships still made a frosty, dissipating mist. One turret blaster was crushed underneath; but the other moved, as he watched, to fire two defiant shots into space.

Rick retreated again, expecting the enemy to reply. No shots came, but he lay motionless for a long time in the flowing shadow of the iron peak. He was afraid to move again, cold with a dread that the unknown enemy would discover him when they came to examine their unwarned victim.

But the enemy didn't come. The photophone light went out and the unknown attacker was lost in the black of space. At last, when the concealing night had flowed over the wrecked Guard cruiser in the hollow, Rick slipped down to it.

His hopes fell as he inspected the damage by white starlight. The bow compartment was caved in. A shell had penetrated amidships, exploding inside the engine room. Another hit, near the stern, had wrecked the air lock so that it seemed impossible to get aboard. But the ship was obviously crippled beyond repair—as completely disabled as the *Good-by Jane*.

It was difficult to hope that any of the crew survived. But he knew that men had lived to fire those two final shots. He found a loose steel bar in the twisted wreckage of the ground gear, and began tapping desperate signals in the Interplanet code.

Empty space carries no sound. He pressed his helmet against the black steel to listen for an answer. When none came he thought that he and Rob McGee were the last men living on the rock—and doomed themselves to slow asphyxiation as the strange runaway carried them four million kilometers a day into the interstellar abyss.

At last, however, near the battered stern, he heard a feeble tapping, spelling slow words: "Who are you?"

"Drake." That brought no immediate reply and Rick added thoughtfully: "I know nothing about attacker. Enemy has gone. You know McGee and I unarmed, helpless. Can we help each other?"

An answer came at last, the taps slower and more faint:

"No provocation for attack. Can't understand—if you are innocent—pardon. Eighteen men alive, but air equipment wrecked. All taking ametine to await relief. Signal aid if possible. Anders."

Rick tapped back: "If I can repair photophone."

That brought no reply. He heard no other sound from within the ship. Anders had fallen with the last of his men, Rick supposed, into drugged pseudodeath. He knew that the sleep of ametine would postpone their death from oxygen thirst, perhaps for many days.

Rick returned to the *Good-by Jane*. He found Rob McGee unmoved. Hopefully he climbed into the pilothouse to see if the photophone could be repaired. It couldn't—for the guardsman had carried away the receiver and there was no extra.

Dull with exhaustion and defeat, Rick went down again to McGee's silent cabin. The gray-faced spaceman lay appallingly cold and still but the stethoscope found his pulse again—now risen to twenty beats a minute.

"Well, Cap'n Rob, you aren't missing much." Rick tried to grin, but he couldn't shake off the burden of inexplicable disaster. "Anders grounded the *Jane*, and now our mysterious friends have grounded him."

He kept on talking for his voice seemed to push that dead silence back.

"So we're both marooned. Anders has got our photophone receiver aboard the wreck, along with our bags of diamonds. We can't signal and we can't get away." He groped resolutely for the one hope left. "But the Guard will surely send out a relief ship when they don't hear from Anders in—"

He caught his breath and anxiously stooped. For McGee's eyelids had flickered. The gray, square face furrowed with a slow agony of effort. Shining sweat misted the forehead. At last the squinted eyes came open. Dilated to the whites, they were black wells of desperate mute purpose.

"It's all right, Cap'n Rob." Rick could feel his terror, like a ghastly presence, and he tried to reassure him. "Anders won't cause us any more trouble. The cruiser's crippled and he has taken ametine with all his men."

But McGee still fought desperately to speak.

"Take it easy, Cap'n Rob," Rick urged him cheerfully. "All we've got to do is wait. I'm going to keep awake in case anybody comes near enough to pick up my helmet photophone. But maybe you had better take another shot of ametine. Because we'll have to shut down the peegee field to save the batteries. They'll run the air machine for another week or so. But then things will be a little dreary. You're better off asleep."

But McGee's yellow head shook in the pillow

in feeble slow motion. He drew a long, rasping breath. His wet gray face creased with a frown of desperate effort. And Rick knelt beside the berth to listen.

"Don't . . . don't wait." Out of that drugged abyss his whisper came thin and labored and queerly slow. "For help—won't come. Now I understand—everything. Too weak—to explain. But no help—is possible. And enemy—won't—come back. You must—get us off—yourself, Rick. Try to rescue—Anders. Save the men. But get away—before . . . before April 10th. Because the rock—is going—to collide."

The whisper was slower, now, and scarcely audible. But Rick had dismissed the idea that McGee might be out of his head for those tortured words somehow carried a terrible, sane conviction.

"Proof—you can do it—that call I didn't make—yet." McGee fought through long seconds to draw another breath. Leaning closer, Rick barely distinguished the fading words: "You must—repair—the *Jane*."

Then the dry lips ceased moving. The dilated eyes had closed again. McGee's wet hands felt stiff and cold and Rick couldn't tell that he was breathing. He listened with the stethoscope again. The pulse rate had fallen back to eighteen beats a minute.

## IX.

That singular message, whispered with such anguish from the depths of McGee's drugged sleep, increased Rick's own dull bewilderment. He couldn't guess how McGee might have solved the riddle of the rock. Yet, remembering the little spaceman's uncanny perception, he dared not question the warning.

It was impossible to repair the ship. He knew it was—for the emergency batteries were far too weak to drive it, and the engine wouldn't run without a manifold. He thought hopefully of the charged set of batteries for the drill, but even they would hardly lift the ship.

Yet, facing implacable difficulty, Rick Drake found within himself a gigantic stubborn strength. It came down from his father, the red-haired giant of his memory. It was the old unvanquishable might of the spatial engineers, the spark of human greatness born to claim this new frontier from the night of space.

He attacked the impossible.

The time that came was a long nightmare of work and weariness and pain. He went back to the wreck and studied its damage again and made a plan. The air lock, he convinced himself, was battered beyond possible use. The hole where the shell had gone in, amidships, was too small to admit his armored body. He brought the prospecting drill and began cutting his way to the cruiser's engines.

The armor was hard to cut. Forged of toughened steel laminated with refractory alloy, it was meant to withstand armor-piercing projectiles and nickel-iron meteors and even the contraterrene drift.

The little drill was never designed for such a task. The tantalum points could scarcely cut the surface of hardened steel, and the oxyhydrogen flame burned in vain against the layers of heat-proof alloy.

At the beginning he had only one set of fully charged batteries and no way to recharge them. To get the utmost current from the cells he had to stop often to let them recuperate. Waiting for the batteries to rest, he worked with a little hand drill and even with hammer and chisel.

Several times he went back to the *Good-by Jane*. Rob McGee was still fast in drugged pseudodeath, his pulse rate never more than twenty. Rick knew nothing to do for him.

The little ship was cold and silent. The air was damp and stagnant, growing foul already, for he had turned down the air unit to save the emergency batteries. He had turned off the heaters and shut down the paragravity field. He couldn't help thinking that the ship was already like a square steel coffin.

He slept a little, waiting for the batteries to recover. But his lank body was clammy with the penetrating cold and the bad air made him restless, and the continual want of weight filled him with uneasy discomfort. He began to feel a gnawing hunger but he dared eat only a little of the soaplike stuff misnamed Ambrosia for fear that the long hours in his armor would give him spaceman's colic.

The batteries in his armor failed for want of recharging. He replaced them with the power pack from McGee's smaller suit and returned to the impossible job.

Then a time came when both sets of drill batteries, hooked in parallel now, failed to recuperate. Recklessly, he went back to the *Good-by Jane* and tore out half the emergency cells. With their last precious strength he cut through the base of the last triangular flap of shell-twisted metal that had barred his way.

He crept through the ragged hole into the wreck. By the dimming glow of his helmet light he explored the shambles that had been the engine room. He had hoped to find the engines intact, but the confined explosion of the shell had done frightful damage. The forward engine was simply gone.

Sick with discouragement, Rick turned aft. Even the after engine was no more than a shapeless mass of metal. The multiple boilers had blown up and the massive lead hood had been ripped away by the explosion of ammonia and

steam and sodium vapor and disintegrating U-235.

With little hope he cleared away the twisted wreckage. A sudden elation took his breath. Somehow, shielded by the heavy mechanism of injector and disintegration chamber, the brittle shell of the manifold had escaped destruction. He removed it with a care and skill he thought had gone from his stiff, weary hands, and carried it eagerly back to the *Good-by Jane*.

Disappointment shattered his hope again. The manifold nipple was three times too large to fit the injector on the ancient engine of the little tug. He had no refractory gaskets—and molten uranium, flowing at 1900° Centigrade, wasn't easy to confine.

But he remembered a patch of gray clay that he had seen while he was looking for the diamonds. He found it again and ground a clod of it, and molded a dozen wet little rings and left them in the air lock for the vacuum of space to suck the water from them. One of them didn't crack. It stood the test of the oxyhydrogen jet. He used it to seal the manifold against the injector.

With tired hands he slid a new ingot of fuel uranium into the feeder tube and started the oxyhydrogen flames under the manifold. Then he had only to wait. For all his dread of the explosive splash of molten metal spilling it was hard to keep awake.

But the gasket held. The fuel-metal flowed through the manifold and the peegee field drew a thin stream of pure U-235 into the injector again. Under the great lead hood, atomic fire burned. The ancient boilers heated and the whispering turbines spun. The murdered ship came back to electric life.

The exhausted batteries charged again. It was good to feel the comforting weight of his long body in the ship's internal field. Rick climbed back to the wardroom and started the heaters and turned up the air unit. Standing in front of its silent fan, he sucked his lungs full of the first good air he had breathed for days—and went to sleep.

Then Rob McGee was calling him in a voice of frantic urgency. The call came from far away so that he couldn't distinguish the words. But he could sense the little spaceman's fear, and a terrible pressure of time. He struggled out of sleep and found himself sprawled stiff on the wardroom floor.

"Cap'n Rob?" His voice came thick with sleep. He clambered to his feet and stumbled into McGee's tiny cabin. "What's the matter—didn't you call me?"

It was hard to believe that the call had been a dream. But McGee lay still under the blankets in that same dead sleep. His pulse was only twenty.

But how much time was left? Drugged himself with the poison of fatigue, absorbed in that long

impossible task, Rick had lost the count of days. He climbed heavily into the pilothouse to look at the ship's chronometer. The date on the calendar-wheel surprised him. It was four in the morning of April 9th.

It was the last day. Tomorrow, McGee had warned him, the rock was going to collide. He didn't know what it would collide with. A collision didn't seem unlikely for a body plunging out across the meteor belt at four million kilometers a day. How McGee had managed to predict the time of it, in his drugged slumber, he couldn't understand. But Rick trusted the old spaceman's sanity and his strange perception.

They must leave the rock today.

Tomorrow, he remembered, would be also the last day of grace to pay the taxes on Freedonia. But no use to think of that, he advised himself bitterly, because the diamonds were somewhere aboard the wreck and Pallasport was by now at least eight days away.

Freedonia was lost.

But no use to worry over that. Human life came first and he had enough to do today. A glance at the engine showed that it was running smoothly, the batteries aboard almost fully recharged. He climbed into the pilothouse and lifted the little vessel out of the pit of shadow by the pole.

Rick landed again in that shell-torn yellow hollow with the tug's air lock beside the jagged opening in the wreck. He set the drill batteries to recharging and turned at once to the task of rescue.

The emergency pipe was a wide tube of airtight fabric. A pressure ring sealed one end to the outer rim of the tug's air lock. The other end was more difficult to secure. He pushed it through that ragged hole and used emergency patches to seal it to the cruiser's plastifoam lining. Five pounds of oxyhelium distended it to a rigid tunnel from ship to ship.

That pressure was still too little to unlock the automatic bulkhead doors. He had to cut the bolts with the drill before he could enter the after compartment where the survivors were.

The first glimpse made him feel ill. The wreck lay on its side and the rock's feeble gravity had brought the men to rest in grotesque attitudes against the lower walls. Most of them were naked to the waist, soiled with smoke and blood and vomit. A few wore sodden bandages. Ashen faces were fixed in expressions of agony and peace and silent mirth. Fast in the sleep of ametime, they all looked like dead men. Only the stethoscope assured him that they lived.

Rick carried them out, one by one, through the engine room and the fabric pipe and laid them side by side in the holds of the *Good-by Jane*.

Captain Anders was the last he came to—still clutching McGee's ancient pistol, which he must have used to tap his signals through the hull. Rick took him to his own berth.

And now the diamonds—for the chronometer told him that the afternoon and evening of April 9th remained before they had to go. Since he hadn't found the diamonds in the compartments he had explored, he supposed they must be somewhere in the caved-in bow.

He put on his armor again and closed the air lock behind him. The purring economy pump salvaged most of the precious oxyhelium from the pipe and the cruiser while he moved the little drill to the forward bulkhead.

The force of the explosion had jammed the automatic doors. But now the batteries were strong again and the metal wall cut like butter. He explored the crushed-in bow compartments. In the control room he found two frozen, space-dried mummies—the one with the platinum star had doubtless been Commander Hauptman.

At last the glow of his helmet light found the cruiser's safe, built into the after bulkhead of the astragation room. It was locked. The men who had known the combination were unconscious or dead. Suddenly regretful of a comparatively blameless past, Rick brought the little drill forward to attack it.

The metal of it was hard and refractory, as the hull had been, and no armor-piercing shell had opened the way for him. Peering through a dark shield at the glowing metal that drank the heat of his pointed flame without yielding, Rick thought wistfully of his father's old dream. A bar of any contraterrene metal would slice into this stubborn steel like incandescent iron thrust into ice. But men had never worked seetee—and perhaps they never would, if he failed to get the diamonds.

Grudgingly, at last, the tough metal flowed. Beneath, however, was a layer of something even more refractory. He attacked that with a tantalum point. When the drill could do no more he found a live shell in the cruiser's magazine and gingerly unscrewed the fuse to get at the contents.

A few minutes before midnight he lifted the thick safe door out of its frame with a judicious forty grams of propellant tritonite. The job looked almost professional, he thought with a certain pride; and then reflected that the evidence of it might easily send him to the prison rock.

The three small ore bags were neatly stacked in the bottom compartment of the little safe. Beside them, surprisingly, was the missing photophone receiver. To each item was wired a neat little label, signed by the cruiser's warrant officer, reading:

Exhibits

Mandate vs. Drake & McGee

Rick gathered them up. He ignored a cash box and bundles of papers and the cruiser's logbook and the black brief case that Anders had carried. Towing the little drill, he hastened back aboard the *Good-by Jane*.

"Well, Cap'n Rob!" he shouted cheerfully into the doorway of McGee's small cabin. "We've got the diamonds back."

McGee was awake again, his dilated eyes black and strange. He quivered with the effort of a long, slow-motion breath. His gray wet face furrowed with the pain of his struggle to speak. Rick stooped to listen.

"Take off—now!" That faint and labored whisper was hoarse with a dreadful urgency. "No time—to waste. Collision—with seetee rock—minutes now. Get away—from this rock—far away."

His glistening ashen face went lax again, unconscious.

Rick clambered up the ladder well into the pilothouse. Still his homemade gasket held. They had the diamonds and Anders and his men. They were ready to go. Standing with his head in the periscope hood, he opened the main drive field.

They lifted out to space again.

He found the small gray fleck of Pallas, back behind the runaway, hanging beside the misty golden spindle of the zodiacal light, and swung the vessel toward it. Then he turned the periscope again to search the diamond-pointed spaceward void for whatever the runaway was going to hit.

He found nothing, queerly. There wasn't even the flash of a seetee blinker. He made a search in the *Ephemeris* for any body the rock might strike on its mad flight out of the System—and still found nothing.

The hours passed. Dwindling in the periscope's dark field, the runaway presented the same tawny and ominous face of shocking, insoluble mystery. There had been no collision. He made an impatient effort to shrug the riddle away. After all, they had the diamonds, he told himself; and the riddle didn't matter.

But it did.

He set up the calculator to find a dead-reckoning position: from the known position of the original contraterrene asteroid, HSM CT-445-N-812, determined from the *Ephemeris* for ten o'clock on the evening of March 23rd; and the observed direction and velocity of the rock's inexplicable spaceward flight, taking into account the diminishing gravitational drag of the Sun and the planets, from which it was so swiftly escaping.

He swung the periscope to check his bearings on Pallas—and Pallas wasn't there. In a moment he found the bright, ragged little crescent again—but fully twenty degrees from where the calculator said it ought to be.

He lacked Rob McGee's uncanny gift for celestial measurements. So far as his eye could tell, Pallas looked as distant as any of the stars. But it struck him that its broken half circle was still surprisingly large.

He stared accusingly at the calculator and then swung the solar sextant behind the periscope lenses to get a reading on the radial distance. He twisted the vernier knobs to make the shadow disk fit the darkened image of the Sun and looked at the scale. The result made him whistle.

For the dead-reckoning position was seventy million kilometers off! According to the sextant the rock must have been carrying them back toward the Sun at four million kilometers a day, instead of out of space ever since they landed on it.

But that was sheer nonsense. He tried to find

his dazed and spinning brain—almost too astounding to be accepted.

He snatched the recovered photophone receiver with awkward, trembling fingers and spliced the cut wires. Now everything was swiftly dropping into a pattern of simplicity, but still he didn't dare believe. He didn't trust the chronometer. He wanted to ask what day it was.

Then he heard a clatter in the galley.

## X.

Rob McGee was busy at the galley stove. He seemed a little pale and drawn, but he greeted Rick with a cheerful, squinted smile. "Leave her on the pilot-robot," he invited, "and have some breakfast with me."



something wrong with the sextant but the well-worn instrument seemed in perfect order. Hopefully, he took another reading. It was the same. He began to wonder if the rock had done something to his sanity.

Wait! He remembered an imaginative chapter from the treatise on possible types of nonterrene matter. The answer to the whole riddle dawned in

Relieved, Rick said, "Then you're all right again?"

McGee sipped hot tea with a spaceburned smile of deep contentment. "Since we got off the rock," he said softly. "The time has come back to me—and that was all the trouble. Except I'm starving now. You look a little lank yourself. Set another plate."



Bacon was crackling fragrantly on the tiny electric stove. Rick didn't know how long it was since he had eaten anything more than a bar of soaplike spaceman's rations. His mouth began to water, but there was one thing he had to know:

"The date—what day is it?"

"March 24th." Grinning happily, McGee was breaking eggs into the pan. "Now I know what time it is. It's eight forty-nine and fourteen seconds in the morning—no matter what the chronometer says—and that means breakfast."

"The calendar-wheel says April 10th," Rick made a dazed little shrug. "But I had begun to wonder since I tried to read the sextant—and I remember, in that book of dad's on nonterrene matter, the author works out the mathematics for a type of matter with a negative coefficient of time. I thought it was just a crazy daydream then." His blue eyes frowned at McGee, still half bewildered. "Wasn't that it, Cap'n Rob—something wrong with time?"

McGee nodded slowly and his eyes went dark for a moment as if with the painful memory of the strange illness he had suffered. "That was what upset me, Rick—I couldn't tell what time it was. That was what laid me out more than the ametime. I wasn't altogether asleep and I felt a little better as soon as I got it figured out—except I was afraid we couldn't get away before the collision, and the drug made it so hard to speak to you. The headache stopped as soon as we got off the rock." His square, ugly face was smiling with a child's glad smile. "Because I knew the time again."

"There wasn't any collision," Rick protested, still deeply puzzled. "Anyhow, none that I could see—I watched for hours after we got away."

"But there was," McGee said gently. "At ten on the evening of March 23rd—not quite five hours ago. That nova you saw from Pallasport—remember? If we had been delayed another hour on the rock—well, we wouldn't be talking about it."

"Eh!" Rick tried not to shudder, but he felt as if the puzzle of the runaway planetoid was still a net of contradictions set to snare his very sanity. "The whole thing seems too impossible—maybe just because I haven't got your special sense of space and time. It's hard for me to put it all together—and I can't believe it when I do. Won't you please explain it all to me, Cap'n Rob?"

"Later." McGee set down his empty teacup and started toward the ladder well. "Now I've got a sort of appointment to make a very important photophone call. I don't believe in defying fate. If I didn't make this call we might have to land on that rock again." Some dread made a brief tremor in his voice. "Watch the eggs, will you?"

Nimble as ever, he mounted into the pilothouse. Rick watched the eggs and set another plate on

the wardroom table. He had left the three bags of diamonds there, and now he saw that McGee had poured a little mound of black dust and limpid fire from one of them. He pushed the treasure back against the wall—and then hurried to take up the eggs and drop a huge slice of ham into the sizzling pan.

At last McGee came back down the ladder with a singular smile in his squinted brownish eyes. He said softly, "I've just made that call to you at Pallasport, Rick—the one I hadn't made before. I told you to have your space bag packed and tried to warn you what to expect—without saying anything you wouldn't believe." With a brown, quizzical grin, he added: "That's how I knew we were going to escape that collision. I simply had to be alive to make that call!"

"Oh—" Rick's mouth fell open but he recovered suddenly. "Of course!" He caught his breath. "And those eighteen men below—I suppose we'll meet Anders in about two days, and let him take them back to Pallasport?"

McGee nodded. Seating himself at the table he stirred a million dollars' worth of diamonds with a stubby forefinger and poured himself another cup of tea. He grinned appreciatively. "No wonder he tried to find out where we got them!"

"Please tell me how it all happened, Cap'n Rob." Rick was frowning again in baffled concentration. "I can see that the rock must have carried us back a week or so in time while the chronometer was running forward. But still it's hard to understand all that happened."

McGee tore the wrapper off a box of dry space biscuit and heaped his plate with eggs and bacon. His fork wavered in the air while his tanned brow creased with his search for words.

"You've seen movie film run backward," he said at last. "So that broken dishes seem to put themselves together and a burned match is whole again and divers come out of the water and float back to the springboard?"

Rick nodded, breathless.

"That's what was happening, all the way." The fork still wavered. "The rock was simply moving the other way in time. I don't see how such a thing is possible—I haven't read the book. That's what upset me. But that single fact is the answer to everything that happened."

"I see," Rick put in eagerly—though he wasn't quite sure he did. "There must be parts of the Universe—stars or maybe even galaxies—made of the minus-time matter the old professor was guessing about. And that rock was just a stray fragment, out of some blown-up minus-time planet!"

"No doubt it was." Reluctantly, McGee put down his fork. "It must have been drifting through space for millions of years—of our future

and its past. It came plunging into our system. At ten on the evening of March 23rd, it happened to collide with the seetee asteroid, HSM CT-445-N-812. Since the invader was normal matter they were both annihilated."

Rick was leaning across the table, hunger forgotten.

"That collision was the last moment in the history of the minus-time rock," McGee's soft voice went on, quietly confident. "But we were looking at it in reverse, like a film threaded wrong, so that collision seemed the beginning of it to us, instead of the end."

"I see!" Rick's bronze head nodded. "After the collision it seemed to be plunging out of the System instead of coming in, just because we were looking at it backward."

"Until we landed on it." Frowning at something, McGee sipped his bitter tea. "Then something happened to us. Then we were carried back through time, along with the rock—back toward the collision on March 23rd. I don't know how."

"Some kind of induction effect," Rick suggested. "In the book, the old professor works out a theory that time is just another sort of force, on the same order as magnetism and paragravity. If he's right the rock would be surrounded with a minus-time field, extending out for several radii. That field simply carried us along."

"Must be." McGee rediscovered his plate and reached for his fork again. "That explains the whole thing."

"Wait!" Rick protested. "There's still a lot I don't see. For instance, how did the Guard cruiser come to vanish? . . . Oh, I see!" He answered his own question. "When it dropped into the minus-time field of course it was carried back in time, while the plus-time of our own system swept us on ahead. And that shadow—that black outline I thought was a shadow—that was really the cruiser, too, beginning its backward loop in time. And . . . eh?"

Rick gasped for breath, half rising.

"So that's what it was!" He stared at little McGee, with an expression of dazed comprehension. "That other cruiser—the one Anders fought—weren't they really both the same?"

With a mild gleam of enjoyment in his squinted eyes, the little spaceman calmly set down his teacup. "Yes, I'm afraid Captain Anders had the misfortune to attack his own ship," Rob McGee said softly. "Since he was going to land on the rock he was already there when he arrived."

"Say that again," Rick demanded. "Slow!"

"Captain Anders evidently found it a little confusing, too." McGee grinned. "He was following the customary Guard procedure, of asking questions first and shooting when he failed to get a

satisfactory answer. But, since the film was running backward for the cruiser that happened to be going the other way in time, the order of events was reversed in each case. The shooting came first and then the questions. And even when the questions did come nobody could understand them—any more than you can understand a sound-track in reverse."

"Oh—" Rick caught his breath again. "So that was the unknown language?"

McGee nodded cheerfully.

"Captain Anders just got himself involved in a kind of vicious circle. He fired on his own ship because his ship was firing on him." McGee grinned in pleased expectation. "He'll be a little upset, I imagine, when he comes out of the ametime and finds what day it is."

"Let him figure it out for himself." Rick's drawn, bronze-stubbed face broke into a slow answering grin. "When the cruiser was burned up in that collision the evidence of my safe-cracking job must have gone along with it. He couldn't prove we've got the diamonds back."

"He was a little too cocky, anyhow," McGee solemnly agreed. "Best thing in the world for a smart young man to meet something he can never be certain about. But now I'm starving and my eggs are getting cold."

He attacked his plate, but Rick was too thoughtful to eat. His brown finger stirred the little pile of dust and diamonds. In the dull soapy glitter of the uncut stones he could see the rising outlines of future great machines to harness and subdue the hostile wonder of contraterrene matter. He could see a thousand airless rocks, terraformed with these same diamonds to make the rich, inviting islands of tomorrow's brave empire. Again Rick Drake was the spatial engineer, a young and daring giant reaching out to push the new frontier of men one farther step against the challenge of the stars.

Late next day their photophone calls brought acknowledgment from the Guard cruiser, driving out to meet them from the ragged new moon of Pallas. Anders seemed puzzled and disturbed to speak them here, and at first he didn't want to stop.

"Never mind how we got here." Rob McGee was quietly serene. "But we've got eighteen men aboard, the survivors of a wrecked Guard cruiser. Some of them are injured and they're all under ametime. You had better take them back to Pallas."

"Impossible." Anders was annoyed and curt. "What cruiser, and how was it wrecked?"

"You had better ask the men when they wake up," McGee told him softly. "You wouldn't believe me if I told you. But they're in urgent need of hospitalization, captain, and you have

speed enough to get them back to Pallasport two full days ahead of us."

"We're on an important special mission," Anders rapped. "Refuse to be delayed by any tricks."

"This isn't our trick," McGee assured him gravely. "And the lives of these men are in danger unless they get attention. One of them is a very important officer. When you find out who he is you won't regret stopping."

"I must refuse." But Anders seemed a little worried. "I'm sorry but we can't take the time—"

"But you can," McGee interrupted cheerfully. "I happen to know you're going to stop. Perhaps you'd better talk to Drake."

Rick listened to his questions.

"No, Captain McGee hasn't lost his mind," Rick insisted. "And we didn't need seetee power to beat you here from Pallas—even if we were twice delayed on account of a separator-manifold. But you had better take these eighteen men. They really need attention. We can't tell you anything about them, but I believe they know something about the runaway rock."

"Then we'll take them," Anders snapped at last. He put the cruiser's astragation officer on the photophone to fix the rendezvous. Six hours later the two ships came gently together. Men from the cruiser sealed a fabric pipe between the air locks. Rick saw some of them staring, with half recognition on white, sick faces, at the deathlike forms they carried out of the holds.

"I'd swear, Mike," he heard a spaceman mutter fearfully, "one o' them half-stiffs is a ringer for you." And the other answered, "Hell, Smitty, that one's *you*!"

Anders mounted the ladder into the tug's pilot-house. Rick and little McGee listened calmly to his brittle-voiced demands for information. Who were these drugged men, he wanted to know, and what had happened to their ship?

"Since when," Rick asked hotly, "is it a crime to rescue the survivors from a wreck at space?"

McGee spoke more softly, urging: "They'll soon be waking up, captain. They can tell you all about it. It wasn't us that wrecked their ship."

"Then who did?" Anders demanded.

They didn't tell him. When he refused to believe that the *Good-by Jane* could have got here without seetee power, however, McGee let him inspect the ancient uranium—and his brown face turned hard when he saw the patched-on manifold. He muttered one grim word:

"Wreckers!"

"No," said McGee. "We didn't do it—the men will tell you that."

Anders was in a hurry, and even a secondhand manifold was not conclusive evidence. When an ill-looking rating told him that all the men had been transferred aboard, he went down the ladder. But he wasn't satisfied.

## XI.

It was four more days back to Pallasport for the drift-pocked tug. Rick and McGee spent them sifting the dusty black gangue from the diamonds, sorting out the perfect tuning crystals and weighing them into discreetly small parcels. Rick tried to estimate the total value.

"It's hard to believe!" His voice was awed. "Even if we have to sell the most of them for half what they're worth on the black exchanges, they bring enough to build the seetee shop—with plenty left over for taxes and graft."

Early on the morning of March 30th, the *Good-by Jane* landed on the terraformed hill of Pallasport. Shaved again, rested from his long ordeal on the rock, a tall, spaceburned giant in crisp white slacks, Rick walked across the curving street from the spaceport to the Guard hospital. He found a worried-looking nurse at the reception desk and inquired about the survivors from the wreck.

"Do you know them, sir?" Her expression was oddly haunted. "You see, sir—they have upset the whole hospital. They're beginning to wake up from the ametine—" Her voice turned shrill and breathless. "And—what do you think, sir—they claim to be the crew of the same ship that brought them here! Some of them have identification—it's all very peculiar!"

"I know Captain Anders," Rick told her. "May I speak to him?"

"I'm afraid not today." She made a troubled shrug. "There's one of them that says he's Captain Anders. But—well, you see, sir—" Her haunted eyes darted back along the corridor, and she dropped her uneasy nasal voice. "Confidentially, sir—they're all displaying mental symptoms. Collective hallucination, the doctors say, due to ametine shock. Our psychiatrists have them under observation. I'm afraid that Captain Anders—if he is Captain Anders—can't be allowed to receive any visitors for several days at least."

That afternoon Rick took the first small parcel of diamonds to the office of the Venusian Trading Co. He was afraid of trouble because the Mandate government strangled all private business in red tape to favor the great monopolies. He half expected arrest and seizure of the diamonds for the want of some license or permit.

The Venusians and the Jovians and the Martians, however, and even the agents of mighty Interplanet, were all in savage competition. And terraformer crystals were the vital key to further conquest. The delicate task proved easier than Rick had expected. All the buyers were eager to pay eight thousand dollars a gram with a winking assurance of secrecy.

Next morning Rick put through a photophone

call to his father on Obania. His mind could see the roan-haired elder giant, gaunt and stooped perhaps, but yet a giant. His eager voice was breathless and a little incoherent.

"Hello, dad! I just called to tell you that Cap'n Rob got here—well, a few days ago. And I'm really leaving Interplanet. We'll be starting back to Obania as soon as we get a few things done."

He tried to veil his words with caution.

"By the way, dad, I've just paid up the taxes on Freedonia. And we've got a little money left. I mean, there'll be plenty to build that metallurgy lab. So you can start making out the orders for all the new machines we'll need to buy—for Drake, McGee & Drake."

Next day a hospital orderly brought a brief monogrammed note to the *Good-by Jane*, begging Rick to call at the hospital on Captain Paul Anders. Walking slowly across from the spaceport, Rick prepared himself for a fighting interview.

He didn't know what Anders wanted. But a Jovian diamond buyer had told him the rumor of a court-martial pending to investigate the cruiser's loss. Did Anders intend to press his charges against him and McGee—of wrecking and treason? Rick wondered uneasily how much he could explain without losing the diamonds to the greedy hands of a Mandate court.

At the hospital a nurse showed him to a large private room. The first thing that caught his eye was the name engraved on the card beside a huge vase of expensive hydroponic flowers: *Karen Hood*.

Rick hadn't seen Karen and he didn't mean to see her. He had put her declining world behind him, resolutely. Now, however, the flame of a huge Venusian orchid brought back the color of her hair, and with it all the ache of longing he had been trying to forget. He looked hastily away, glad that Anders hadn't read the bleak pain on his face.

For the tall guardsman, propped in a reclining chair, had his back to the door. He was staring out across the cruel landscape of uneroded mountains beyond the huge window. Because the hospital was well down the slope of the terraformed hill, that cragged desert seemed to tip insanely. Every peak was a flat cut-out of savage incandescence, edged with ink-black shadow.

Rick spoke and Anders started nervously. He looked pale and stern, one arm was slung, and his brooding eyes seemed to reflect the ominous sky. Unexpectedly, Rick felt a little sorry for him. For all his evident bitterness, however, he hadn't lost his old self-command.

"H'lo, Drake." He waved easily at a chair beside the window, motioned at the nurse to leave them and deftly mixed two whiskey-sodas—all

with the unslung arm. Rick set down the drink and waited, on his guard.

"Good of you to come." Anders read the implications of the untasted drink and smiled as he explained: "I asked you for two reasons. One is gratitude—because I gather you must have saved our lives?" Rick didn't respond to that half interrogation. "The other is that I'd like to ask some questions."

Rick felt surprised to find himself at ease. Still Anders seemed a dangerous opponent, for nothing had shattered his iron assurance. But, somehow, out on that runaway rock, Rick had discovered a new self-confidence of his own.

"No, captain, you don't owe us anything," he said gravely. "The rumors about your rescue are all a little confusing, but I understand you were brought in by a Guard cruiser—under your own command."

"That's what I'm told." Anders smiled slightly. "And what I want to ask about."

"I'm afraid your questions will have to wait until McGee and I have hired a lawyer."

But Anders didn't wait and the first question took Rick's breath. Watching him with hard steel eyes, the Earthman put it in a slurred, careless voice:

"Un'erstand you're selling diamonds?"

"A few." Rick tried to conceal his consternation. "Family heirlooms."

"No business of mine"—Anders actually grinned—"because I'm in your debt on several counts. All apologies, if you'll just answer my questions. I admit that I was stupid. But I've been thinking—since they managed to convince me of the date."

With a sardonic little chuckle, Anders moved his dark head at a calendar on the wall. Rick saw that the first day of April was surrounded with a heavy black mark. He could feel the growing, anxious tension under that careless-seeming voice.

"Just tell me if I'm right, Drake, and you won't need a lawyer. The answer won't be used against you. Maybe you heard the talk of a court-martial. But I imagine it would be a little hard to get all this through the brass hats, and I managed to pull the wires to get it killed."

Rick felt relieved. Trying not to wonder if Karen had been one of the wires to the chief commissioner, he obeyed a friendly impulse.

"What do you want to know?"

"I remember something you said about the first and the last." Anders was leaning forward, and his self-control seemed almost desperate. "Tell me, Drake—" He hesitated, steel eyes searching. "There on the rock, when we fought that other cruiser—were we fighting ourselves?"

"I'm afraid you were," Rick said. "It seems that time on the rock was negative, and we all

made a circle. Seems you failed to recognize yourself when you met yourself coming back." Helpfully, he added, "There's a book on nonterrene types of matter—"

With quizzical brows lifted, Anders pointed his good arm at a copy of that ponderous work—on the stand beside Karen's flowers. Rick felt an unexpected liking. Kay might be very happy with him.

"Thanks," Anders said. "That accounts for all my evidence against you—and I regret your arrest and the damage to your vessel. But I think anybody might have been confused."

Rick nodded, gratefully, and sternly reminded himself that Anders still belonged to an enemy world. He mustn't talk too much. The lean Earthman stared out into the blue-black sky above the dazzle of the toppling landscape, frowning.

"Circles," he said at last, perplexingly. "Eddies in causation." He turned back to Rick with a slow, apologetic smile. "Scuse me, Drake. Seems you won the game. And the medicos are sending me back home on six months' leave. How's your drink?"

Rick took up his neglected glass. "Your health, captain!"

Anders poured himself another drink. "Here's Drake, McGee & Drake," he proposed cordially. Then, with a quiet in the careless-seeming voice, he added: "Case you're interested, I'm taking that leave alone."

Rick was interested—but he wouldn't admit it.

That afternoon Rick was offering another parcel of tuning diamonds to Interplanet. An office boy showed him into the luxurious hush of an expensive private room to wait for the buyer. Sitting at an exquisite silver table too small for a giant, he spread the diamonds on a square of black velvet. Twenty perfect crystals, weighing nearly thirteen grams. He determined not to be talked below a hundred thousand Mandate dollars.

"Hello, Rick." Karen Hood came through the glass-curtained doorway. Emotion flushed her high-cheeked face, and her hair was vivid flame. She came slowly toward him, soundless on the deep rug, carrying a blue envelope. Her eyes were dark and repentant and shining.

"Nice to see you, Kay." But he hadn't meant to see her and the sight was a stabbing blade. Still it wasn't easy to leave her world behind—or her. He rose beside the toylike silver table,

awkward and uncertain.

"But you weren't going to." Hurt silence for half a minute. He saw her red lip quiver—and tried not to want so much to take her in his arms. Her velvet voice was crushed, pleading. "Please, won't you forgive me for calling you a traitor?"

"Of course, Kay." The weakness was a throbbing ache in him. He caught his breath and towered like a bronze and mighty giant above her. His voice turned deep with purpose. "But still I'm leaving Interplanet."

Her flame head nodded, meekly unprotesting.

"I know you are." Her voice was low and grave. "That's why I've come to ask you for a job—with Drake, McGee & Drake."

Rick stared at her. His bronze head made a little disbelieving jerk. But his heart was suddenly pounding so that he couldn't speak.

"I mean it," she said. "I'm leaving Interplanet, too. Because I think you need a business manager for your new metallurgy lab—whatever that is going to be. Here's my letter of introduction."

With a breathless little smile she laid the blue envelope beside the row of diamonds on the silver table. Rick leaned down to touch it stupidly.

"It's the transcripts of all your photophone conversations with your father and McGee from the secret files of Interplanet." Her voice had an odd catch, half gay and half alarmed. "You'll have to hire me, Rick—to keep you and all your friends out of Pallas IV."

"Honest, Kay?" He gulped, incoherent. "I mean . . . would you . . . really—"

"I really would." Her smiling eyes were wet. "I've been thinking while you were gone." The flash of anger came back in her voice. "You said some cruel things—but we'll have plenty of time to quarrel over that. You know I came to space because I didn't like what Interplanet had made of Earth, and now you've made me see that the Mandate is only a temporary makeshift. If you really think you and your asterites can start something better, Rick, I'm willing to help you try." Her clear voice turned as husky as his own. "That is—if you still want me—"

He did. He shook away his awkwardness and came around the table. They didn't see the diamond buyer, standing in the glass-curtained doorway. But that dealer's shrewd face smiled. His agate eyes turned soft again, perhaps with some forgotten memory of the green Earth and youth. He left them alone.

THE END.

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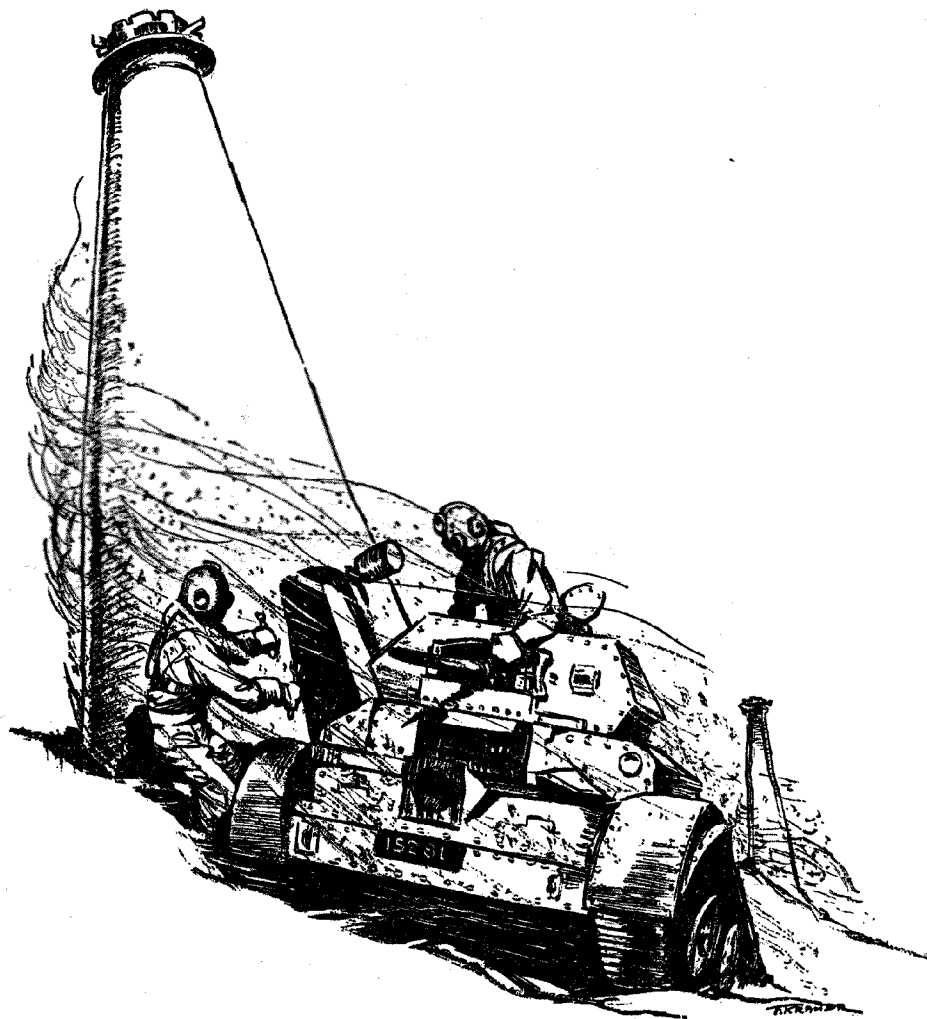


ADAM  
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SECRETS AND AGENCIES

CONVENIENTLY LOCATED EVERYWHERE





# SAND

By Colin Keith

● Mars is a desert world, a dry, rusted corpse of a planet. And deserts are always tricky things—but a world of shifting sand made trickier yet by shifty crooks—

Illustrated by Kramer

The grimmest joke on Mars is the daily weather forecast. You see it—if you can see anything—just as you leave the skyport at Ghengiz. It is engraved in inch-deep letters on a monolithic block of permalite, and even that unabradable stone is worn round on the corners from years of sand blasting. The standing prophecy says:

**WEATHER FOR TODAY AND TOMORROW**

Hot, dry, and windy, with sandstorms and shifting dunes

It is a triumph in paradoxes, for it is not only a masterpiece of accuracy, but of understatement as well.

Special Investigator Billy Neville found that out before he had been on the ruddy planet five minutes. The light scout cruiser that had brought him hardly had her grappnels firmly engaged in the deeply anchored mooring net than he could see a small blue police tank careening across the field toward him. He could only glimpse it now

and then, for the driving sand was as impenetrable to the vision as is flinging sleet. Then the little tank bumped alongside and a moment later a man crawled through the lee entry port. He carried a heavy suit on his arm.

"Here you are, sir," he said, "your anabrad. Put it on over your uniform, otherwise you'd be naked and flayed after about a minute out there."

Neville picked up the garment. It was not greatly unlike a diving suit except that it was unarmored. It was of a tough, rubbery texture, had leaded soles for weight, and a helmet with flexible, unscratchable glassite goggles. He put it on, shook hands with the skipper of the cruiser, then stepped out into the blast.

The local man helped him into the little tank and pulled down the lid. Then it veered away from the cruiser, rose on one set of treads, and sailed dizzily across the field, heeled over at a sharp angle to the "breeze." The driver slowed at the gate just long enough to grin and point out the forecast for the day. Then he pulled his blue bronco back into the wind and bucked his way up what Neville took to be the main street of Ghengiz.

"The boss'll be glad to see you," yelled the driver, above the steady hissing of the rain of sand on the tank's foreplate. "Things have sure gone to hell here, and I don't mean maybe."

Billy Neville grunted. He had not the faintest idea of what Martian problems were, nor anything about the planet. But it was a safe assumption that when he was sent anywhere, things were tough. Just now he was coming from Venus after a hectic year spent in cleaning up the *gooroo* peddlers. He had hoped for a few weeks' leave on Earth en route, but apparently that was not to be.

He disregarded his garrulous driver and peered out the sand-stricken visiport. He could not help but notice how peculiar Martian architecture was. None of the buildings had any opening whatever below the second-floor level, and few there, unless on the lee side of the house. All were supplied with rows of grab irons or outside ladders by which the climb from street to door could be made. He guessed, and rightly, that on some days the shifting dunes partly buried the buildings. This day, though, the street was clean and glistening, as if made of polished steel.

The tank teetered and bucked its way ahead, cut a corner, skidded hard against the buildings on the lee side of the street, caromed off and wheezed to a stop before a gloomy structure of heavy permalite.

"Local headquarters," said the driver, and pushed up the hatch. "Take the right-hand ladder."

Neville grabbed at it and climbed, like a rigger going up a smokestack. Two floors up he came to a sheltered platform and a door. The door was yanked open and he darted in. A minute later he

was in the presence of a haggard and weary-looking major of the Interplanetary Police. The major was just hanging up the phone.

"Well, Neville," said he, scrutinizing the young S. I. with hard, blue eyes, "you hit here at the psychological moment. The Xerxes has just been robbed. That is the fifth this year, the fifteenth in the last four years. I've ordered a copter and as soon as it comes we'll fly out and look it over while the trail is hot. I am afraid this will be as hard a nut to crack as all the others have been. But maybe I'm getting stale. That's why I asked for you. A new broom, you know—"

"I hope so, sir," said Billy Neville, modestly. He was still wondering what it was all about. He knew that the only industry on Mars was the production of super-diamonds and that there had been a number of robberies of mines. But that was all he did know. In the jungles of steaming Venus one did not bother much about anything but the immediate job in hand.

He waited, but the major did not see fit to speak again. He merely sat tapping nervously on his desk and frowning down at the papers on his blotter. Then he raised his eyes and looked wearily at Neville, but still said nothing.

"Nasty weather you're having," observed Neville, politely, waving his hand toward the outside generally. "Does it blow like this *all* the time?"

The older cop smiled feebly.

"The obvious answer to that crack is the old wheeze they used to use back in Wyoming. No. It does not. It'll breeze along like this for a week or so. Then it'll set in and blow like hell. But if you think this is bad, you ought to see it down in the equatorial regions. They have sand typhoons there. The mines are in the temperate zone with only strong trade winds to worry over. Yet these circumpolar breezes you see up here are gentle zephyrs compared to those."

He sighed, and added, "It's not the wind that we mind. It's those damned dunes. They won't stay put. Mars, my boy, is not a nice place to live."

The phone buzzed. The worry on the major's face deepened as he picked up the earpiece.

"Yes? . . . What! The Hannibal! . . . How do you know it was eleven days ago? . . . Oh, hypnosene, eh? They just came to and found the safe blown and looted. . . . I see. Well, do what you can. They knocked over the Xerxes not five hours ago. I'm going there first."

He hung up and spread his hands despairingly.

"Gas, always gas. And always a different gas. First it was cyanogen, then phosgene, carbon monoxide, chloroform. We devised masks. Then they sprung thanatogen, neuronoxylene and other fancy ones. There are never any clues—we can't catch 'em—we can't stop 'em. I'm going nuts."

"It might help if you began at the beginning."

suggested Billy Neville, mildly. "You know I got here less than half an hour ago."

"To be sure," replied the major, scribbling on a pad. "In just a moment—"

The phone buzzed again. That time it was a husky voice saying the copter was ready.

"Come on," said the major, buckling on a blaster. "I'll explain on the way."

Wind- and sand-swept Ghengiz faded behind them. They were up out of the dust. Two navigators were busily taking sights on the Sun, and on Deimos and Phobos, both, fortunately, happening to be up.

"The only way you can find your way around this blasted planet," explained the distraught major, "is by stellar navigation. The terrain doesn't mean a damn thing. That range of dunes you are looking at won't be there in another hour. They will not only move west, but they will change their whole contour doing it. Sometimes you see a town—sometimes you don't. It all depends on whether it happens to be buried. We never know. On Earth you can figure the tides, but dunes are different. They move haphazardly and at random rates of speed."

"I'm beginning to find Mars interesting," remarked the special investigator.

"Yeah? Well, listen. Mars is a queer customer. If you know a geologist whose heart you want to break, bring him here and ask him to explain it to you. As near as I can make out, the planet congealed suddenly while it was still a viscous mass of about half iron and half granite, mixed indiscriminately. Somewhere you find outcroppings of steel, in other places stone. Later on it must have acquired an atmosphere. At least we have plenty of it now. That weathered the granite and gave us all this sand. The sand goes round and round and comes out nowhere. At the Equator the dunes are a mile high. At the poles there are no dunes. In between you have every depth. Look!"

He had the copter brought lower and pointed to a deep valley between two ranges of dunes. It looked almost as if there was a mountain lake in its depths. But there was more. A considerable town could be seen in the very midst of the shiny spot. It was a mass of small domes dependent upon a larger central dome, above which rose a slender minaret or smokestack reaching high to the skies. The top of the stack was at least as high as the neighboring dune crests. A turretlike structure sat atop it and sprouted a double ventilator, one cowl turned into the wind, the other away.

"That is a mine—a big one—the Wellington," said the major. "It is sitting on bed steel, and beneath it is a rich pocket of diamonds. When Mars solidified only part of the carbon went into

solution in the iron. Bits of it were pressed into Martian diamonds, far harder and of purer fire than anything ever found on Earth. They are immensely valuable. The tough job for a prospector is finding them, for he never gets more than a fleeting glimpse of the real surface of this planet. After that comes the tougher job of building the mine in spite of the steady waves of dunes that roll over it and keep burying it. Once a mine is set, everything is grand—or would be if somebody had not thought up a way to rob them."

The copter rose higher and continued on southward. A little later it dipped again and the major pointed out something else.

"Another mine—the Robert E. Lee, I believe. It's buried now."

Neville looked. All he saw was a tiny circular building supporting a turret. But above the turret stood the same type of double ventilator he had seen at Wellington.

"Until the dune passes," added the major, "they must draw and expel their air through that trunk. It is also an access and escape hatch. What has us stumped is that all the robberies take place while the mine is submerged and yet no one ever enters through the trunk or leaves by it. How they get in and get away is what we want to find out. For they usually kill everybody in it and pick the place clean before they leave. If you can solve that one, you are as good as you are reputed to be."

Neville did not answer. He wanted to know more. After all, promotions in the I. P. went by merit, not pull, and despite the dejection and apparent defeatist attitude of the major, he knew he must have something on the ball. He would not have been made supervisor of Mars otherwise. So Neville merely bobbed his head and continued to listen.

"There's the Xerxes now!" exclaimed the major, indicating a blob on top a sanddune. It did not look in the least like the full-fledged mine Neville had been shown before. It was just another lonely turret sitting on the sand, like the Robert E. Lee.

The copter circled in the sandy gale, made five tries and finally lassooed the turret with her grapple noose. Then they snubbed down and held bobbing against the turret lee.

"You get an idea," murmured the major, "how impossible it would be for a criminal copter to approach the air intake and pollute it. It takes many tries, and at that it is not always successful. When you think of the armed guards at the top of the trunk—"

But they were already being hauled over the parapet into the turret. Four grim-looking men stood there, armed with electronic rifles. On the floor lay a fifth, dead. He was hideously bloated and covered with purple blotches that stood out in great welts.

"Just in time, inspector," said one who appeared to be their leader. "The air below is clearing now. I think you can go down."

He turned and indicated the graphs hanging on the ventilation ducts. The one on the intake side showed no irregularity—straight air being brought in for days and days. But the exhaust index showed the automatic and continuous samplers of incoming and outgoing air had done their work well. Eight hours earlier the needle had jumped far out and left a quavering track in the poison zone. Since that time it had dribbled its way more and more to the center. The latest reading showed the usual exhaust air—just air, slightly warm, slightly polluted, but no worse.

Major Martin indicated a trapdoor and one of the men pulled it open. A minute later they were climbing down a short ladder into a compartment below. The hatch closed over them, shutting out the howling banshee of the Martian gale. The two huge ventilating trunks filled up one half the circular platform, a tiny elevator being hung between them. The other half of the circle was occupied by a circular iron staircase that went down and down. The major led the way down it a few steps, then thumped the outer wall. It was solid permalite.

"The only access to these mines," he said, "is through these chimneys until the trough comes, and the chimneys have no openings in them except at the top. Another copter load of our operatives will be along in about five minutes to begin at the top and search downward. They will not find anything, but it is routine, starting with a search of the guards up there and then this chimney, inch by inch. We may as well go on down."

They retraced their steps to the upper platform, got into the elevator, and started down. The descent took several minutes, but shortly they emerged into a circular room at the base of the chimney. Overhead great ducts carried the ventilation system, and an outlet immediately above was blowing clean, fresh air. Two corpses lay on the floor, blotched and bloated like the dead guard above. Apparently, from their attitudes, they had died instantly. Major Martin gave them but a glance.

"Necrogen," he said. "It kills at the first whiff."

A corridor took them through the living compartments where the men ate and slept when off shift. The bunks were full of dead. Here and there a body lay slumped in a chair or across a table. It was the same in the office where the heavy safe stood open and empty, its door hanging loosely on warped hinges. It was the same down in the pit, where tough-jawed machines cut the diamond-bearing iron matrix away in chunks. It was the same in the stamp room, and no different in the place where the acid vats were in which

the matrix was dissolved away from the imprisoned sparklers. There was no one left alive in the Xerxes. Shortly a careful tally showed that not one of the employees was missing; they were all present—dead. Then the major showed Neville the great iron doors that gave the plant its lower exit onto the iron subsurface of the planet.

"That door opens outward," he said, "and at this moment against a pile of fine sand a thousand feet deep."

"Tunnels?" suggested Neville.

"You don't do much tunneling through diamond-studded steel," replied Major Martin dryly, "but we keep searching for them. There are none. Moreover, even if there were, there could be no practicable outlet. They have yet to invent a mole or any kind of vehicle that can navigate under sand. The only locomotion available on Mars are the crawlers, as we call those little tanks. Copters are reserved for police use only."

Neville glanced at the ventilating ducts overhead and at the scattered corpses. The job was obviously done by admitting poison into the air-feed system, but how could the murderer get away, even if he had a gas-proof suit?

"What about the guard at the top of the chimney?" he asked sharply. "Why couldn't they have pulled the job, thrown the loot and other evidence down to an outside confederate, and then turned in the alarm?"

"They could have," admitted the major, "but they didn't. Two of the members of that guard are my own trusted operatives, acting under cover. We had another down here, but we've lost that poor fellow. No, it is an outside job."

Neville thought that over. Then his eye caught a little mound of raw diamonds beside one of the acid vats. They had evidently come out of the processing machine just as the robbery occurred, and had therefore not been picked up by the collectors and added to the other stock in the vault. He was amazed to see that they were of all colors—ruby-red, emerald-green, water-white, sapphire-blue, moss-green, pink, yellow and pale-blue.

"Do Martian diamonds come like this—all colors out of one hole?"

The major nodded.

"Another tough aspect of the case. If they only produced red ones at one place and white at another, we might hope to trace them after they are stolen. But Martian diamonds are wonderfully uniform in respect to everything but color, and those are invariably mixed as you see them here. It makes it nearly impossible to find the fence."

"Hm-m-m," said Neville, pocketing the handful of sparklers.

When they arrived at the Hannibal they found it completely uncovered, and were able to land in its lee on the slick hard surface of the mother

planet. The story there was much the same, except that the gas had not killed, but put to sleep. The only dead were the tower guards, and they appeared to have been rayed down from behind.

Neville took the occasion to have a close look at the outside of the mine. He could not rid himself of the suspicion that there must be some way to enter one except at the very top or bottom. He scrutinized especially closely the slender stack that rose twelve hundred feet above him. On its lee side an iron ladder rose all the way to its pinnacle, otherwise the chimney was bare, sand-blasted permalite. Neville set up a telecamera and made careful shots of the chimney all the way up and from every angle.

"I've seen enough," he said at last, picking up a few samples of the Hannibal stones. "This is a job that will take some thinking over."

"I'll say," said Major Martin, sourly.

By nightfall they were back in Ghengiz and at headquarters.

"What do you think?" asked the major desperately. "You have inspected two, and when you've seen one you have seen them all. The technique is identical. Who is doing it, and how?"

"Dunno," smiled Neville, who had slumped back in his chair and was gazing dreamily at the ceiling. "I haven't got that far yet. What I'm trying to dope out is the motive."

"Motive! Why, money, of course."

"Sure. But how much money? Even pirates don't go into wholesale massacre for the sake of a few bushels of diamonds once in a while. And the details of the Hannibal incident prove that the robber doesn't have to kill to get at his loot. It seems to me—"

The phone was buzzing.

"Yes," acknowledged the major wearily. He listened a moment, grunted, then hung up. He turned to Neville.

"The miners at the Cortez and Attila have struck. They are afraid to go on working and demand a police escort to bring them into the labor barracks here at Ghengiz. That makes the sixth mine to shut up out of fear of bandits."

"I'm not surprised," said Neville calmly, "and that gives us our No. 1 suspect. Tell me who stands to gain most by closing all these mines, and you will name the man behind these robberies. He is a clever man and thoroughly unscrupulous. What is his name?"

Major Martin frowned at his desk, considered the question a moment, then said, "Mario Hustings answers the specifications. I have thought of him as a possibility before. But there is absolutely no hookup. Moreover, he is our most dignified, wealthy and powerful citizen. We will have to practically convict him before we even accuse him. He is owner of the Consolidated, which embraces the Wellington, the Custer and the Scipio—"

"I thought you had an antitrust law here," challenged Neville.

"We have. But it was enacted after Hustings built his first three mines. Since then they must be individually owned and operated, or be shut down and revert to the public domain. The only monopoly that Hustings has is the Martian Construction Co., and he has that by virtue of patent rights. He devised the type of building you have seen, and when anyone gets a charter to open a mine it is Hustings' company that does the construction work. After that he has no more to do with it."

"That's interesting," murmured Neville. "One more question. How much have your diamond exports fallen off since the robberies began?"

"Not any. Which doesn't prove a thing. Of course, the sales of Consolidated have risen with the robberies, but so have those of the independents. It has been the custom of the diamond industry from the beginning of time to maintain an even supply so as not to break the price. All the companies have reserves—much of it here in the government vaults. So when one or two mines fade from the picture, the others make up the loss out of stock. You won't get anywhere along that trail, I'm afraid. Even if you suspected the other companies were acting as fences, you still could not prove the diamonds were stolen unless you catch the thief in the act. Martian diamonds are indistinguishable."

"I'm not so sure of that," said Neville. "On Earth they are all different."

The major talked on, his gloom deepening as he talked. Mars was surrounded by a cordon of fast cruisers, giving absolute assurance that no unauthorized ships landed or left. The only port of entry was Ghengiz, and the most minute searches were made of every ship coming and departing. Major Martin was willing to stake his reputation that not one of the stolen diamonds had been taken away from the planet yet. The outbound cargoes were all from the government-bonded warehouses. The more he talked, the more hopeless he made the case appear. There were no criminals on Mars, or any place for them to hang out. Ghengiz was the only town, and it was well policed. Otherwise there were only the mines.

Neville yawned, got up and stretched.

"I'm going to putter around in the laboratory for a while before I turn in," he said. "By the way, will you have your operatives get me a few diamonds from each of the mines? Make sure they were mined there, too, and were not just in the vault."

"Certainly," agreed the major, and jabbed a button. "I already have them."

The next activities of Special Operative Billy Neville might have mystified another man, but



Major Martin took them with patience and a measure of hope. For he knew that Neville was reputed to be the best trouble-shooter on the force. Neville spent hours studying the enlarged photos of the mine stack. He spent other hours sitting before a huge vacuum tube in which he bombarded diamonds with high-tension current. The results were not wholly encouraging. Some threw back phosphorescence of an apricot hue, others of pale-green, red and orange. But, to his disappointment, not all the sample diamonds from the mines showed distinguishing phosphorescent colors. After that he sat in the dark for a while, idly rubbing them with a silk rag.

By morning, though, he was reasonably satisfied. His next request was that sample lots of diamonds be brought him from the bins of the mines in the bonded warehouse. After he had looked over a few of those he announced his intention of calling on Mr. Hustings.

"What for?" asked the major.

"To size him up, for one thing," replied Neville, casually, "and to jolt him, for another. Please have two of your best shadows on the job, for I want him tailed from the time I leave."

The local inspector merely raised his eyebrows, but signified he would comply.

"While I am gone," added Neville, "I would like to have a crawler made ready, with an assortment of pipe wrenches, nipples and connections in it. And a container of harmless gas with a distinctive odor to it. Peppermint oil, say."

"Done," was all the major could say.

The interview with the diamond magnate was brief. Neville found him in the offices of his company and was admitted immediately. The millionaire met him at the door and shook his hand cordially. Mario Hustings was a fine-looking man for all his sixty years, well built, bronzed and with a genial smile.

"Well, well," he said, as he pumped the hand. "So you've come to solve our crime wave, eh? I wish you luck, but I fear you will be here quite a while. I am sure you will, unless you are far more competent than our local sleuths."

"On the contrary, Mr. Hustings," said Neville, evenly, "I expect to return to Earth within a very

few days. I find the case simpler than I expected. It is already solved. I do not think you will have any more robberies."

"Ah," said Mr. Hustings, dropping the hand. It was a long-drawn "ah" and ended with a rising inflection.

"The culprit is still at large," Neville hastened to add, "but we expect to apprehend him shortly."

"Good work," said Hustings heartily. "That will be a great relief to us all. Cigar?"

"No, thanks. There are a few loose ends to pick up yet and I can't stay."

Neville hurried back to the laboratory and spent another hour hurriedly scanning the dossiers of all of Hustings' employees. By the time he had found what he wanted, the tank was ready. Major Martin chose to accompany him.

"Find me a mine," said Neville, "that is about half submerged."

The roughriding little vehicle lurched off, swaying and plunging in the wind to the steady hissing of the driving sand against its sides. They plowed through lesser dunes, but as they got farther south the dunes became more and more mountainous. At times the tank would climb steeply, only to fall into a sideslide and go slithering down the face of the wave, like a wind-blown chip in the ocean. As the wind rose, they caught fewer and fewer glimpses of the sky through the curtain of driving sand above them. The tank driver made his way by compass and other mysterious instruments on his dash.

Presently it halted, crawled ahead and stopped. At first Neville could see nothing. But in a moment he made out that they were in the lee of a segment of a stack. He could not see the top of it, for it was obscured by the whipping sheets of sand, but he could see a few rungs of the outside ladder leading upward.

"They can't see us, either," he pointed out to the major, meaning the men of the tower guard. "Now let's rig a safety line and get around on the windward side of this chimney. That is what I am interested in."

The other side was smooth, seamless permalite, despite its continual assault by sand. They had to wait for fully an hour until the growing dune

**NO FINER DRINK...**

AT WORK



OR PLAY



PURITY...

**PEPSI-COLA**

IN THE BIG BIG BOTTLE

had pushed them thirty feet higher. Then Neville saw what he was looking for—a little projection. It was the stub of a one-inch pipe, sticking out just far enough to admit a cap being screwed on. A helper brought the bag of wrenches and a moment later the cap was off, the connection being made, and the tank of aromatic oil brought up to be hooked on to them.

Neville screwed the last union home, then hunted for the other thing he was looking for. It was only a few feet away and almost invisible, it was camouflaged so perfectly. It was simply a short lever, recessed in the face of the chimney wall. He tripped the valve on the gas container, waited until its contents hissed away, then seized the lever and jerked it down. A small section of the wall slid open, making a doorway just large enough to admit a man clad in anabrad or a gas-proof suit. He beckoned to Martin to follow and ducked inside. Then he shut the panel quickly so that no more sand would blow in.

Down below the alarm sirens were howling and men were shouting.

"Better get word to them it is a false alarm," suggested Neville. "We don't want to be cut down as burglars."

They stayed but a few minutes, then went out as they had come in. They wanted to get out before the secret door should be buried by sand.

"It's as simple as that," Neville remarked on the way back to base. "This thing has been planned for years. There are several of those pipe connections and secret doors at different levels. They were put there when they built the stacks. The pipes lead into the intake air duct, the door is so closely fitted and so placed that the most rigid inspection of the interior would hardly be expected to reveal it. I spotted them on my enlargements of the plates. They have gone undiscovered from the outside for the reason that it is impossible to inspect the weather side of one of these chimneys except as we just did, and heretofore no one has thought it necessary to do that.

"Hustings' man could simply come here, screw on his poison gas whenever the sand rose to the proper level, go down and rob the place as soon as the gas did its work. Ten minutes later he

could make his getaway, unseen and unsuspected."

"Hustings' man, huh?" growled the major. "How are you going to prove that? It is true his company built the chimneys, but that does not necessarily involve him personally."

"It's going to be hard," admitted Neville, "but I think I can do it."

Back at headquarters they encountered two sheepish operatives. Shortly after Neville's visit, Hustings had hopped into a crawler and hurried away to the southward. The I. P. men trailed him in two other tanks, but he lost them in a sand-storm. When last seen he was heading somewhat to the westward.

"That would be the Scipio," was the major's guess.

"Absolutely. That is where his poison gas is made," asserted Neville. "Apparently he took my visit seriously."

"How do you know that?" demanded Major Martin.

"His head chemist there formerly worked for Tellurian Chemical. He is a recognized expert on lethal gases. Moreover, the present superintendent of the Scipio was formerly a construction foreman for the Martian Building Co. It is my hunch that all of Hustings' accomplices live and work at the Scipio. I found out plenty this morning when I read their dossiers. We can make the arrest any time now. I am satisfied—"

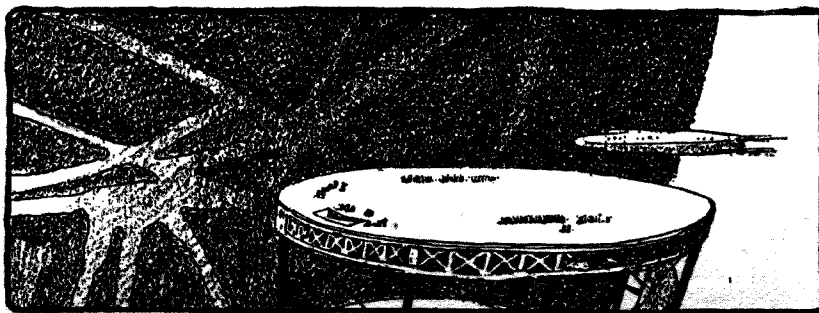
The alarm bell on the wall began to tap. The phone buzzed.

"Sorry, Neville. But you are dead wrong about Hustings," the major said after he had taken the message. "The Scipio has just been knocked off. Hustings wouldn't kill his own men."

"Oh, wouldn't he?" said Neville grimly.

A moment later the door opened and Hustings himself walked in. His genial manner was gone. It was plain that he was excited and angry.

"A fine lot of policemen we have here!" he roared. "Yesterday you tell me you have broken the robbery ring, yet just now I get word my Scipio Mine has been robbed and all its people murdered. Necrogen again. What about the man you said you were going to take into custody?"



What are you waiting for?"

"For you to come back," said Neville quietly. "The man is in custody. Put the nippers on him, boys."

The two operatives sprang forward and despite Hustings' roars slapped the irons about his wrists.

"You got away with a lot, Hustings, but it's all over now. Your killing the man who built your trick chimneys for you and the man who made up your poison gases along with the jackals that did the dirty work won't let you out. It merely saves us that many trials and a mass execution. We have enough on you to hang you without their testimony."

"You can't connect me with those chimneys," Hustings yelled, his eyes ablaze and his face purple, "or the gas, either. Suspect and be damned, but what can you prove?"

"Well," drawled Neville, "leaving out of account the train of circumstantial evidence—of which there is a lot, I assure you—and the quite obvious advantage it would be to you to have all the other mines driven out of business, we have the simple fact that you are in possession of all the diamonds stolen from the looted mines. They are all impounded in this very building."

"Pah!" snorted Hustings, struggling with his wristlets. "Martian diamonds do not carry any brand. The phosphorescent test is meaningless here—they all respond the same—"

"So I discovered," said Neville dryly, "or, rather, most do. However, I applied a test you seem to have overlooked. Did you ever hear of triboluminescence? It is astonishing that a man of your cunning should have missed it—"

Hustings was glaring, panting.

"Rub a diamond in the dark with wool or silk and it is likely to give off a dim light. Your Martian gems are most responsive to it. The Hannibal stones, for example, glow pale green, whereas the Custer's are a deep magenta. Every local mine has its characteristic color. What's more to the point, the vaults in the warehouse bear that out. Each mine's output corresponds with the stones it produces. Except yours. In your vault we found not only stones from your mines, but several bushels each from all the robbed mines. *But none at all from the unrobbed mines!* If you can explain that—and where you have been the last six hours—you have nothing to worry about. Take him away, boys!"

Special Investigator Billy Neville sank into a chair. He was tired, and the ceaseless whine of driving sand was getting on his nerves.

"It's all yours now, major," he said. "Call a cruiser, won't you? I want to see some water for a change—not sand."

THE END.

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# VULCAN: ICE KING

By Malcolm Jameson

● **Vulcan, God of Fire and volcanoes, isn't the sort of being you'd ordinarily associate with the world's worst—and coldest—weather. But he's responsible—as Jameson shows!**

Illustrated by Fax

It would be the height of irony if this coming winter Japan should annihilate Hitler and Nazism. If it is done—and it may very well be—it will be done without intention or malice; even unwittingly. For by Japan is meant Japan, not its rulers, its armed might, or its people, but the island of Honshu itself—an inanimate thing of rock and soil. Islands before this have wrecked empires, and there are signs now—summer, 1942—that it is about to be done again. Asamayama is reported to have erupted! Will Hitler, who but recently complained of the unfairness of last winter's cold, freeze outright next? He well may. That will depend upon the magnitude of Mount Asama's action—let us pray that the violence of its explosion was of the first order. For only that will freeze over the Baltic, exterminate the invaders of Russia, and reduce the fuel-impooverished inhabitants of Germany to shivering wretches whose only thought is to obtain warmth at any cost.

Extravagant? Fantastic? Not at all. We are too prone to think of volcanic catastrophes in terms of local disaster. While such explosions do wipe out entire populations and level cities to the ground, the aftermath of them is far more widespread than that. Eruptions of terrific violence—the kind that in the course of a few seconds vomit millions of cubic yards of stones, bombs and cinders into the high heavens—cause darkness to fall upon all the regions around, and thermometers to tumble the world over. The latter effect is, as often as not, the more serious, since it affects more people and is more persistent. The desolation wreaked in the immediate vicinity of the restless mountain may be done in a matter of hours, after which there is peace. The blizzards and gloom that are spread over all mankind may endure for months and years. It is those by-products which we hope that Asama will endow us with in this particular year. For Asama is the king of ice makers. It is conceivable that a score of Asamas, erupting in stately rotation like the firing of the massive cylinders of a Gargantuan motor, could start another glacial age.

Possibly Asama first exerted itself in modern

times in the year 1707. Of its identity there is no certainty, as Japan at that time was closed to all outsiders except a handful of Portuguese missionaries, but there is little doubt that an "unknown Japanese volcano" was the chief culprit responsible for the extraordinarily cold years 1708 and 1709. Two other volcanoes participated, Vesuvius and Santorin—on Thera, in the Aegean—but judging from Asama's subsequent performance later in the century, their role was probably a minor one. The results were these: following the triple eruptions of 1707 there was bitter cold all over Europe and in the colonies of North America for two years. The River Thames and the Adriatic froze; there was ten feet of snow in Spain and Portugal. Even the summer of 1709 was cold and rainy.

This was not a freak performance, though it is the first time that a Japanese volcano is mentioned in connection with European or American harsh winters. From the days of the destruction of Pompeii the literature of the times reveals that bitter weather usually followed in the wake of violent eruptions. Hecla, in Iceland, was an occasional offender, being charged with the cold winters of 1637 and 1694. 1695 was a bad year, too, with long and severe cold followed by a chilly summer, but that was due to the activity of an East Indian trio of craters—Celebes, Amboina, and Gunong Api. Europe's own Vesuvius went into eruption in December, 1631, almost equaling its performance in 79 A. D. It threw up dust clouds to the height of forty-eight kilometers, and the resultant murk brought intense cold in its train. The following year was marked by destructive snows, a short summer, and again early frosts and more snow. While it was yet early fall—October 4th—a detachment of soldiers froze to death between Montpellier and Bazières, which is in the south of France and close to the Mediterranean.\*

\* The instances cited above and hereafter are selected from a table correlating volcanic activity with unusually severe winters in the chapters on "Vulcanism as a Factor in Climatic Control," "Physics of the Air," W. J. Humphreys, published by the Franklin Institute, 1920. The writer is deeply indebted to this work for what appears herein, and much else. It is highly recommended to anyone desiring a good grounding in its subject.



From 1707 to 1783 there were several instances of volcanoes bringing snow and ice to the world, but it was not until the latter year that another really major eruption occurred. And that, when it did come, was the most frightful and devastating on record. When Asama exploded in 1783 the damage it did to Japan was vast, but it also spread intense cold and dimmed the skies over all the world. This state of affairs endured for three years, assisted no doubt by the concurrent explosion of Skaptar Jökull, in Iceland, and prolonged by one of Vesuvius in 1785.

Benjamin Franklin, in May, 1784, wrote:

During several of the summer months of the year 1783, when the effects of the Sun's rays to heat the Earth in these Northern regions should have been the greatest, there existed a constant fog over all Europe and a great part of North America. This fog was of a per-

manent nature; it was dry, and the rays of the Sun seemed to have little effect toward dissipating it, as they easily do a moist fog arising from the water. They were indeed rendered so faint in passing through it that, when collected in the focus of a burning glass, they would scarce kindle brown paper. Of course, their summer effect in heating the Earth was exceedingly diminished.

Hence the surface was early frozen.

Hence the first snows remained on it unmelted, and received constant additions.

Hence perhaps the winter of 1783-4 was more severe than any that happened for many years.

The cause of this universal fog is not yet ascertained. Whether it was adventitious to this Earth, and merely a smoke ball proceeding from the consumption by fire of one of those great burning balls or globes which we happen to meet with in our course round the Sun, and which are sometimes seen to kindle and be destroyed in passing our atmosphere, and whose smoke might be attracted and retained by our Earth; or whether it was



the vast quantity of smoke, long continuing to issue during the summer from Hecla, Iceland, and that other volcano which arose out of the sea near that island, which smoke might be spread by various winds over the northern part of the world, is yet uncertain.

It seems, however, worthy the inquiry, whether other hard winters, recorded in history, were preceded by similar permanent and widely extended summer fogs.

This excerpt has been quoted at length because it gives both a description of the effects of extreme volcanic action, whatever its point of origin, and hits closely at the explanation of them. Franklin was a shrewd and observant man, and the bulk of his surmises and speculations have since been confirmed by the findings of science. The fog he spoke of was Asama's volcanic dust, a potent obstacle to the Sun's rays.

As a virtually solo performance, the great blast of Asama of 1783 is supreme. For a full century no other single mountain approached in ferocity its outbreak of that date. Nevertheless, in the interim a very interesting phenomenon occurred—the coldest and most sustained period of misery in the annals of man. It was due, not to the terrific explosion of one virulent mountain, but to the activities of a group of them acting seriatim. This series of eruptions was initiated in the year 1812—the one that ruined Napoleon—by Soufrière on St. Vincent. On April 30th, just when Bonaparte was about to launch his ill-fated attack on Russia, Soufrière—not to be confused with the mountain of the same name on neighboring St. Lucia, or Grand Soufrière on Guadeloupe—blew off. That it was bitterly cold in northern Europe during the winter that followed no one needs be told. Though Napoleon may have blundered, and granting that Kutusoff's Cossacks did their work well, adequate credit is due the smoky frost giant of the West Indies.

Soufrière's blowoff was only the beginning. Two years later mighty Mayon, one of the more murderous of Luzon's many explosive cones, thundered into eruption, so there was no relenting of the frigid weather. But worse was yet to come. On April 7, 1815, Tomboro let go with appalling violence, killing fifty-six thousand persons at one stroke. For three days darkness prevailed for three hundred miles around, so vast was the quantity of ash and dust heaved up by the mountain. And Tomboro, being situated on Sumbawa, which lies between Java and Timor and therefore in the midst of a hotbed of craters, jolted many of those into activity by its blast.

It is not to be wondered at, then, once the relation between Vulcan's fires and iciness is conceded, that the succeeding year should break all records for bleak chilliness. The period 1812-16 culminated in what is variously known as "the year without a summer," "poverty year," or, in the

quaint American idiom of the day, "eighteen-hundred and froze-to-death." It was in that year of 1816 that snow lay unmelted throughout the summer in districts as far south as the Ohio, and when the current seasonal illness for August was frostbite, not sunstroke.

In the six decades subsequent to that pinching year there were nine other major eruptions, but none of sufficient violence to cause more than a single winter of undue inclemency. Their listing is omitted here for the sake of brevity, but the fact that each of them was trailed by much lower temperatures than was reasonable to expect adds to the already impressive accumulation of evidence of the linkage between vulcanism and cold. It was in 1883 that Asama's runner-up for the volcanic championship made its bid for fame. Krakatoa, between Java and Sumatra, tore itself asunder in a blast second only to that of the old master in 1873. Thousands of people were killed; titanic forces were unleashed. The mountain itself and the islet on which it stood disappeared, and tidal waves of such size and force as to be perceptible as far away as Cape Horn were set up. The amount of volcanic dust ejected was prodigious, and it is estimated that much of it was hurled to the incredible height of eighty kilometers.

A few months later an Alaskan volcano went into violent eruption, adding its not insignificant contribution to the dust of the stratosphere. For the next several years there was unseasonable cold and harsh winters, but by way of amelioration the Earth was treated to gorgeous sunsets everywhere, colored by the dusty atmosphere. Often by day the reddish-brown corona known as Bishop's ring could be seen surrounding the sun, which itself shone feebly as through a veil—corresponding to the phenomenon remarked upon by Franklin the year after Asama. And then, just as the dust clouds were about to settle, New Zealand's Tarawera, far in the south, belatedly exploded in 1886, prolonging the period. All the winters from 1883 to 1886 were severe, and old New Yorkers still speak with awe of the great blizzard of '88, though that may have been from other causes.

The great trio of ice giants—Asama, Krakatoa, and Tomboro—are aided and abetted by many lesser members of their tribe. Bogoslof and Awoe gave us the hard winters of 1890-91-92; Pelée, Santa María, and Colima, the ones of 1902-03. Greater than these was our own Alaskan Katmai, which erupted with immense violence in 1912, throwing out a vast amount of cinders and ash, and darkening and denuding the country for hundreds of miles around. It was on account of its action that the winter of 1912-13 was so biting. Heavy snows fell far south—in Texas, Mexico,

and some in the desert States. That was the year that icicles hung from Los Angeles buildings, and the orange planters burned smudges in their groves night and day in the effort to save them. (Outraged Angeleños please consult the record before sitting down to write.)

There it is, a convincing list. Well, not quite. It also happens that there have been many severe winters preceded by no volcanic activity whatever. Also many volcanoes have erupted without appreciable effect on the weather except immediately and locally. The above list admittedly is one of selected coincidences, but with the difference that it is wonderfully consistent—there is a common denominator somewhere. And about forty years ago scientists set out to find out what it was.

Climate, as distinct from weather, is made up of a number of things. Roughly speaking, they may be divided into two classes, local factors, and general ones. The local factors are more apparent and more readily understood. Thus, the climate of Greenland differs from that of Sumatra chiefly because of difference in latitude; that of California from that of Nevada, though the States are sitting side by side, a difference due to the existence of a high mountain range between them, shutting the inner State off from the moist air of the sea. The altitude of Mexico City makes it cool, while Vera Cruz, nearby at sea level, has typical tropical climate. And so on.

The exterior factor affects them all together—cooling or heating more or less equally from pole to pole. That factor—I use the singular for convenience—is insolation—the measure of the intensity of solar radiation as received at the outer edge of the atmosphere. Insolation itself is affected by a number of factors, but the complexity of them is of scant interest to the majority of us who live down here on the surface of the Earth. It varies from time to time within a range of about ten percent due to diurnal irregularities and a number of cyclical ones. Solar activity, solar distance, perihelion phase—which has a period of about twenty-one thousand years—and other changes of far greater periods all enter. The only one we *feel*, as a rule, is the variation due to the sunspot cycle, which has a period of between ten and eleven years. For obscure reasons we receive less heat from the Sun when sunspots are most numerous than when they are few. Thus, in the main, every eleven years we should expect

several winters in a row that are rather more severe than the average, followed by increasingly milder years, until we come to the middle of the cycle where we have fairly warm winters for a year or so. It is this feature that gives meaning to Humphreys' comparative table of eruptions and succeeding cold weather. The cold winters he lists as "discrepancies." That is, they came at a time in the sunspot cycle when they should normally be warm. And they were experienced all over the world; not locally from identifiable special conditions prevailing. Curves of pyrheliometric values kept since 1882 come down invariably when a big volcano goes into action. It was apparent that there *must* be a connection. What was it that volcanoes did to make things cold?

To take one last look at the general observational data before seeing what answer the physicists found, let's mention a few of the salient discrepancies noted. After Asama's great outbreak mean temperatures tumbled two degrees Centigrade. That may not seem much, but a two-degree drop in *mean* temperature, if prolonged indefinitely, would give rise to a mild glacial age, since it would lower the snow line about a thousand feet. This drop occurred in a year when there were very few sunspots—about twelve. In like manner, the year 1811 was one of minimum sunspots—the fewest ever observed, zero, to be exact, if I read the curve correctly. Yet Soufrière, despite the indications calling for an exceptionally mild winter, did what it did to the Grand Army of France. Tomboro, on the other hand, blew off at one of the sunspot peaks, when cold weather was to be expected, though the number of spots was low for a maximum, being but forty-five. The very exceptional sequel of "the year without a summer" could certainly not be attributed to such a few sunspots.\*

The explanation of why volcanic eruptions impair the warmth of the Earth is simple—like all other scientific explanations, once a score or more of hard-working scientists have given years to piecing the jigsaw puzzle together for us and boiling the answer down to a phrase or so. It is the high-flung dust that does it, by reflecting and scattering the incoming solar radiation, while at

\* Curiously enough, the only "discrepancy" listed by Humphreys of opposite sign to the ones being discussed was the year 1773, which was inexplicably warm. That year the greatest number of sunspots ever observed were counted—one hundred and fifty! No volcanoes were involved. He is at a loss to account for the absence of icy weather unless the solar constant jumped unaccountably for a short time.



the same time not barring the escape of terrestrial radiation of heat.

Thoughtful men from Franklin's time, or perhaps earlier, had noticed the connection and suggested the answer. But the argument *post hoc ergo propter hoc* has never met with much respect in scientific circles. The scientists wanted to know, not what, but how and why. Mathematics had to back up empirical knowledge. Their earlier attempts to find justification for the action of the dust as a filter of radiation produced a disappointing answer. Rock dust, they computed—for rock it must be—would absorb terrestrial radiation and reradiate it, thereby raising the mean temperature slightly rather than otherwise.

Later it was suggested that a lot might depend upon the size and shape of the rocky fragments. Ascertaining the size of particles of a cloud hanging fifty kilometers overhead would seem to be quite a chore, but Pernter tackled the job and gave us a formula for it. He approached it by starting with the Bishop's rings. Those are about ten degrees wide and have an outer radius of twenty-three degrees. From that and the known laws of diffraction of sunlight he arrived at something under two microns as the dimensions of the particles.

Since volcanic dust is known to be often in the form of thin-shelled bubbles, or fragments of such bubbles, both their tiny size and nature made them far more efficient reflectors and scatterers of the short-waved solar radiation than of the longer-waved terrestrial radiation, the ratio being thirty to one, about. The obvious result would be that so long as the veil of dust persisted, a fifth or more of incoming solar heat would be shut out while virtually none of the escaping Earth heat would be shut in—a sort of inverse hothouse effect. So long as that prevailed, the equilibrium of heat normally maintained between incoming and outgoing radiation would be upset and the Earth rapidly cooled.

But even high, wind-borne dust falls if given time. Other computations were made as to the rates of fall. The various factors are many, but the rough answer is that dust ejected far up into the stratosphere will require from one to three years to settle, depending upon its fineness and initial height. Some dust is as small as half a micron in diameter. So far, theory amply jibes with observed facts. Terrific eruptions do create cold. Perhaps, now that we have balloons capable of exploring the air, when next there is such an explosion more direct data can be gathered.

It is worth noting, also, that the dust is a better reflector of oblique rays than of those falling nearly normal, and, therefore, the chilling effect is the more pronounced in the higher altitudes, thus steepening the interzonal temperature gradients. This gives rise to gales, rains and snows which accelerate the cooling process in the middle latitudes. One is tempted to speculate on the effects of a long, continued series of scattered volcanic explosions, since the situation of the volcano has no bearing whatever on the consequences. They are world-wide in every case in which the dust reaches the stratosphere, where the high winds spread it evenly all over the world. Humphreys has computed that the mean temperature of the Earth has been a half of a degree (C) lower since 1750 than it would have been had there been no volcanic activity; four or five times the amount of activity we have experienced could easily start another ice age. We should be thankful, therefore, that eruptions are as infrequent as they are.

By the same token, let's hope, for this year at least, that Asama will give us an encore to the performance of 1783. It will mean shoveling snow for us, shivering and ice-bound rivers, but I think we can take it. The Russians have proved they can; the Nazis have proved that they cannot. So up and at 'em, Asamayama, boy—do your stuff!

Statement of the Ownership, Management, etc., required by the Acts of Congress of August 24, 1912, and March 3, 1933, of Astounding Science-Fiction, published monthly, at New York, N. Y., for October 1, 1942.

State of New York, County of New York (ss.)

Before me, a Notary Public, in and for the State and county aforesaid, personally appeared H. W. Ralston, who, having been duly sworn according to law, deposes and says that he is Vice President of Street & Smith Publications, Inc., publishers of Astounding Science-Fiction, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management, etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, as amended by the Act of March 3, 1933, embodied in section 537, Postal Laws and Regulations, to wit:

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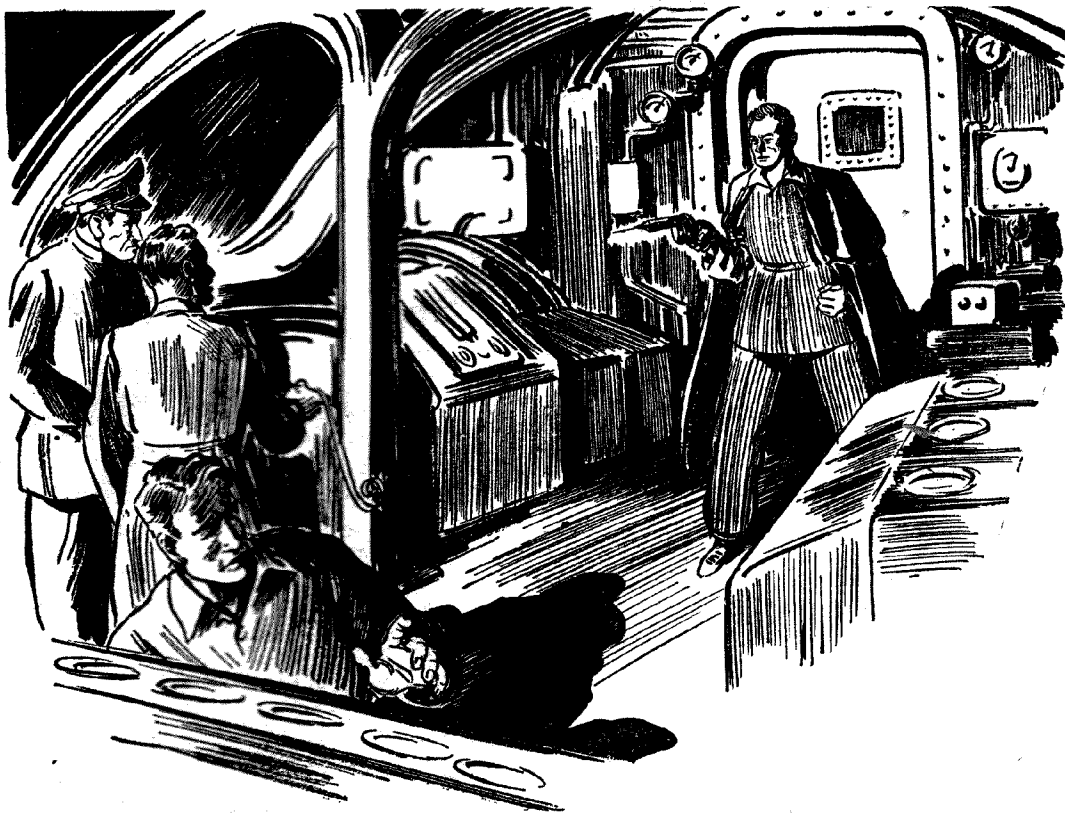
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Sworn to and subscribed before me this 30th day of September, 1942. De Witt C. Van Valkenburgh, Notary Public No. 84, New York County. (My commission expires March 30, 1944.)



# THE GENTLE PIRATES

By John Berryman

● A neat little yarn that proves the old saying "Figures don't lie, but liars figure" doesn't always have to apply to human beings!

Illustrated by Kolliker

The spiraling helio descended softly to the dock. I paid the cabby and stepped out into the ruddy glare of the double sun of Leo III. Before me the stubby bulk of the spaceship lay cradled, her black length slashed by the dully gleaming bands of the geosectors.

"How I loathe you, you spacefish," I muttered to myself as my stomach writhed gruesomely within me. "If my trunks weren't inside your hateful belly I'd call this junket off right now." But just the same I stepped toward the gangplank, where the motley collection of creatures who were to be my fellow passengers were variously walking, crawling and hopping their ways into the ship.

"You're going to walk right up that plank,

Cash," I gritted to myself, "and your dinner is going to stay down there where it belongs." That wasn't so hard: it was ten famished hours since my last fearful snack. "Keep walking, one foot ahead of the other!"

I pretty nearly made it. Just as I reached the steep-inclined ramp that leads through the air lock, the authoritative hand of a guard stopped me.

"Hold it, buddy," he said, grinning. "Make way for some real class." Glad enough not to have to tread the last mile so soon, I stepped aside.

There was a full-dress procession stomping its way up the first section of the ramp, bearing standards, and led by a couple of silly-looking creatures wrenching some wailing cacaphonies from Leonine horns. After all the years I have

traveled—damn every one of them—diplomatic processions are old stuff, so I waited patiently while the envoys extraordinary and ambassadors plenipotentiary traipsed through the lock. Then, shutting my eyes, and taking a death grip on a stomach that was doing its best not to accompany me into the *Caravel's* lock, I walked up the creaked ramp and into the loathsome interior of the ship.

It wasn't so bad once I was inside, probably because I knew that the bar wasn't far away. You know as well as I do that a little nip has a great settling effect on the stomach. I immediately pushed forward to that dispensary of relief where the nine-day drunk that is usual with the Leo III to Leo IX hop was already in progress. In addition to a little drink to smooth out my pitifully protesting insides, I was hopeful of running into some near-humans.

I had been in the *Caravel's* bar something under thirty seconds when I saw the most perfect-looking human I ever hope to see. She was tall, as Terrestrials go, perhaps five feet ten. You hear a lot about perfect figures, this kind of hip, that kind of leg, and so on, but this unbelievable creature had them all. And she carried herself like a queen, or maybe a goddess. I'll make that definite: like a goddess, and I say that because of her hair. It wasn't quite platinum-white. There was just enough gold in it to make it the color of heavy cream, and she had it piled halolike in soft, smooth masses about her head. Her face, and the rest of her skin, was a deep tan, as though she spent most of her life in the sun.

The sight of her was a tonic. One good look at her did more for my struggling insides than any number of drinks would have done. I decided I had better make hay before another human showed up, and moved in.

It didn't start off exactly right. I stepped smiling and debonair across the soft rug to where this dream-creature stood, holding out my hand and onto my stomach. You'd be surprised how well that usually works, the hand part, I mean. Darned few humans, away for months at a time from anything with a digit even remotely resembling the human paw, can turn down a chance to shake hands. But my vision turned coolly away, just far enough to show me that I was getting the cold shoulder, but not far enough to admit that she had to turn her back on me to get rid of me.

That might have been the end of it, right there. She certainly had that queenly, hard-to-get look about her. But the fates, and my queasy insides, intervened. Just as my face and extended hand were falling, and my stomach rising, I felt the gravitic compensator plates bring our weight up to space standard preliminary to blasting off. A wave of awful revulsion swept over me, my old knees just wilted, and I could feel my unwillingly

expectant stomach do a half gainer.

The dream-child's eyebrows arched with surprise and she started to turn back to look at me. I don't know what came over me. It was like a flash of genius. Instead of standing there and taking it, which I have done a hundred times, I just wilted over against her and started to slide gracefully down her side to the deck. She executed a neat demiswoop and snatched me up before my wilt was completed. Scooping her drink from the bar she made as if to toss it into my face, but I gave a few quick signs of life and she held back.

That's why I hate spaceships, you see. I was fresh out of my psychoanalyst's office, fresh from having him explain it away again and fondly pronounce me cured. I know as well as he knows that it's a conditioned reflex and that the whole thing goes back to when I was a kid and came to Leo III with my folks, suffered with them through a nightmare when the compensator plates went haywire and our gravitic constant fluctuated like an aspen leaf. It's silly, I know. Elevators don't bother me, helicopters are duck soup. But let me get into a spaceship, hell, let me even look at one, and I become so damned gravisensitive that I'm not worth a dime. It was perfectly true that I knew that the *Caravel* had just been re-equipped with the new Reisenberg drive that never varied more than a tenth of a dyne, perfectly true that my old side-kick, Joe Thornton, was in command of her, but, just the same, I couldn't kid myself out of it. And so long as I was on that cursed spaceship, every microscopic change in acceleration could be depended upon to send my reflexes into a panic of involuntary recollection. I felt horrible.

You can imagine how profusely I apologized, how I explained what a queasy so-and-so I am, and how much I appreciated her ready arm and kind hand. She did the rest. She suggested that what I needed was a drink, and agreed that she might as well join me, and so on. Her name was Desi Rodez, she'd been born on Venus and, best of all, she talked Terrestrial.

Desi and I devoted the next few days to making life interesting for each other. We might have kept at it until we docked at Leo IX, and maybe for quite awhile after that, except for these damned queasy insides of mine.

We were tucked away in an alcove of the ship's bar, sipping skeptically at what the Deslupurgian barkeep fondly described as Martinis, when it happened. Desi had been prattling on about finishing school back on Earth when my stomach started to do one of those horribly familiar flip-flops.

"Huh!" I exploded into the middle of Desi's patter. She opened up those violet-purple eyes of hers in mingled surprise and annoyance and asked me what was the matter.

"You didn't feel that, sugar?" I asked, knowing



pretty well that she hadn't.

"What, Cash?" she asked again.

"They just cut the drive. I could feel the plates compensating for it." I was groping to recall whether I'd ever felt the drive cut in the middle of a trip before, and I couldn't remember that it'd ever happened.

"Now you're not going to swoon all over me again, are you?" Desi kidded me. "This crystal voile toga is too fragile for you to slither down my side again!" She bubbled a little with laughter. "And what do you care if the drive was cut? Maybe our brave captain is sightseeing." I gave her the look I reserve for beautiful but dumb things, which made her laugh softly once again. "I think I want to dance, Cash," she then informed me, and stood up with the grace of a panther, holding out inviting arms to me. What did I do? What could I do?

After we had danced for a while, Desi seemed to tire of it and we broke it up. During the whole time we had floated around the dance floor in each other's arms I had been getting more and more jittery about the drive's not being cut back in.

"We'll eat together?" Desi instructed me.

"Do you think I'd miss one minute with you, sugar?" I reproached her. She daubed a little kiss on my cheek that promised another, and left me.

As soon as Desi disappeared I headed for the fo'c's'le with the idea of getting into the restricted confines of the control room. Joe Thornton, the *Caravel's* captain, had helped me hold up some of the better bars in the Galaxy. In addition to that, back in the days when I was just a plain engineer, before I went into sales promotion, I'd helped design the detector-calculator layout up front. If it hadn't been for meeting Desi I would have gone up long before to look over my brain child.

As it happened, I might not have gotten up front at all because Joe had a sailor posted at the control-room entrance with some pretty strict orders about admitting passengers. He didn't even see my fifty-credit note when I let him smell it. Just when I was about to give up, old Joe Thornton came storming out of the door and nearly knocked me on my tocas. He would have got clean away if I hadn't hollered at him.

"Hey, Joe!" I yelled. "What gives?"

Joe's a big old bruiser, a Terrestrial, like the rest of the *Caravel's* operating crew. "Hi ya, Cash," he growled in what he seems to think is the voice a captain should have. "See you later, boy, I'm busy!"

He started to hightail down the corridor, but I caught up with him and grabbed his arm. "Hold it, cappy!" I snapped, a little sore that he should waltz by me like that. "How come you cut the drive?"

Joe burned one of his stares right through me. "You felt it, did you, you queasy bum?" he tried to whisper in a mild bellow.

"You bet I did, Joe. What goes on?"

For a minute Thornton looked as though he didn't know which way to jump. Then he yanked me by the arm back into the control room. A tall, dark boy was sitting at the control board, and Sparks, a sandy-haired squirt that Thornton had with him for years, was huddled in the corner over his sets.

As soon as the relay had kicked the door shut behind us, Joe gave me the low-down. "Listen, Cash," he growled, "there's a pirate after us!" I must have looked skeptical. Thornton bristled. "Sparks just got a signal for us to heave-to if we didn't want a shell in our tail."

"I've got to see it before I'll believe it," I responded.

It sounded like a gag to me. Piracy isn't exactly a thing of the past, of course, and on some of the planet-to-planet pulls in the wilder solar systems it does still occur. But on a star-to-star pull? No, the very idea of spaceships' contacting each other while riding the geodesics smells bad mathematically.

Joe Thornton had said the ship was there, and Joe isn't exactly what I'd call the hysterical type. I know my business, so I naturally moved over to the detector-calculator.

The *Caravel* had one of our big Multiplex-Polyphase models, with enough sense in it to do any problem anyone has ever thought up. Sure enough, the detectors had hold of something, and it was what I mean close! That really gave me a wallop. I guess I hadn't actually believed Joe's story about the pirate, but the detectors had hold of something out in the interstellar void, and that could only mean a ship.

I must admit that my conversation at that point was not scintillating, to say the least. "How did he do it?" was all I could think of to say, giving Joe a look describing incredulous astonishment. Joe didn't know, or wasn't telling. "This is absolutely unheard of!" was my next brilliant remark, and one which, I believe, should be preserved for posterity as one of the most asinine things ever said in a moment of stress.

The dark-haired boy at the control board seemed unable to stand any more of my mouthings. "Not absolutely unheard of," he said with the caustic rasp that strong men reserve for their remarks to the weak. "It's happened twice before."

I guess I was getting a little self-conscious about my gooey reaction to the whole mess. "Who's this guy, Joe?" I demanded, a little hot that he should tell me off. "And how come I've never heard of it if it ever did happen before?"

I was ready for anything by then. Joe didn't even faze me when he said soberly, "It's true,

Cash. Here, meet Tommy Scott, my navigator. Tommy, this is Cash Bowen from Galactic Calculators." We shook hands. It's a treat to feel a human appendage, especially when you spend half your time in the wrong parts of the Universe, the way I do.

After shaking hands we stood facing each other like a couple of high-school kids who can't think of what to say next. Then I whirled on dopey Joe Thornton, who seemed to be waiting for Scott and me to go into some kind of an act.

"Well, come on!" I hollered at him. "When did this ever happen?"

Joe was very decent. He gave it to me straight, bellowing only slightly, and with no digressions regarding the biological backgrounds of the persons involved. It came out that about a year and a half before, Earth time, Rocky Sam Berg on the *Thespis* got a heave-to order like the one we had received and kept right on driving. By all that was holy, Joe said, the pirate planted some kind of a shell near the stern of the *Thespis* and made Sam change his mind but quick. Then about six months ago, Earth time, the *Ali-Bendez* had the same thing happen. The captain of the *Ali* had been tipped off, of course, so he cut the drive.

You can imagine how that much of the story satisfied me. "Well, come on!" I squawked again. "How much did they get? What kind of creatures were they? How come nobody ever heard a word about it?"

"The line covered it up, Cash," Joe ground out earnestly. "Nobody was hurt on the *Thespis*, and it was reported as a refrigerator coil blow-out. They got away with plenty both times; a bunch of ceremonial trappings for some diplomatic wedding halfway across the Galaxy from the *Thespis*, and some art treasures worth a mint off the *Ali*." He looked over at Scott and Sparks for a moment. "The pirates were too cagy to show themselves, am I right?" The other two nodded confirmation.

All that set me to wondering. "What the devil do we have on board that's worth a stick-up?" I demanded.

"I don't know, Cash," Joe replied. "But our pal out there does. He wants us to get the diplomatic pouches together in a lifeboat and have Tommy here ferry them across to him. Lord only knows what's in 'em." That reminded Joe of something, so it seemed.

"Jeez!" he exploded. "What am I doing in here? Listen, Tommy's in charge! I've got to tell those damned freaky ambassadors to get into their pouches and yank out what they want to save. I'm not gonna let this strong-arm guy outsmart me!" He started for the door with the efficient grace of a medium tank, bellowing as he ran.

"Don't let anybody in or out. The passengers don't hear a word of this, get me?"

Scott and I had the same idea. We both jumped for Thornton and held him before he could get through the door. "Hey, Cap," Scott pleaded, "don't do that. They'll have to break the seals to get into the pouches, and that'll tip the pirate off for sure. Like as not he'll start shelling us. There's a couple hundred passengers back there!"

We each had Joe by one arm, and for a minute I thought we would have a little display of the manly art of tossing a guy on his tocas, but Joe came to his senses.

Scott was exactly right. I didn't see why we should care that the pirate got away with the pouches. Joe's major concern was to get back with the ship and with his passengers safe. And I must admit that the thought of Desi sitting back there, all unaware of the shelling that might start any minute, had something to do with it. I didn't like the idea of her getting messed up by some dumb crook just because Joe Thornton is as tough as they come, and as stubborn. So I put in a few words to help cool him off. Finally he came back and slammed his haunches into the seat before the control board.

He looked like he wanted to cry. "Cash," he pleaded, looking at me like a big bull that a matador had just stuck. "Tommy." He turned his big puzzled face to the navigator. "What can I do? I can't just sit here and give up. That guy can't get away with this! I'm gonna—"

There just wasn't anything he could think of to do. Sparks got up from his sets and came over to Joe's side. "Take it easy, Cap," he advised in his husky little voice. "That monkey's got the drop on you. We know you ain't yellow."

That word just made Joe feel worse. I couldn't stand to look at his bewildered pan, so I went over to the Multiplex-Polyphase and took a gander at the dials.

The pirate had pulled in a good deal closer, but he was sure playing it close to his vest. At the rate he was approaching, I figured it would be a good two hours before we made contact. I told Joe.

He was feeling a little better. The old ring was creeping back into his bellow. "Cash," he said with a furious shake of his head, "this makes me madder than anything since the day you filled that inside straight! That two-by-four, yellow-bellied son of a gun out there, why—" He burned slowly into silence.

Scott, at least, kept his sense of perspective. "Cap," he said, probably trying to cool Joe down a little, "I suggest we get the pouches together in No. 9 lifeboat. He may pull in quicker if he decides we aren't going to make any resistance."

I relate this next with some shame, now that I can look back on it. Scott's talk about the lifeboat gave me an idea. After all it was plain that the pirate had the thing worked out to a fine point because he knew what ship he had intercepted, the names of at least some of the crew. That meant he knew we were unarmed. And it might mean that he'd get a little overconfident about such a soft touch. So I suggested that a couple tough-minded guys like myself should ride over to the pirate in the lifeboat with side arms, the only lethal weapons on board, and see if we couldn't storm our way into control.

The idea didn't get to first base. "Not me," says Scott. "Where will it get you?"

"Don't be silly," Joe agreed. "You're getting too old to talk like that. By the time a guy starts to lose his hair he should know better than to want to be a hero. And you can bet that this crook is an expert by now. He wouldn't get caught by a stunt like that in a hundred years."

That put an end to it. There didn't seem to be anything to do, or much to worry about either. The pirate apparently meant no harm to us if we delivered. The passengers wouldn't even know what had happened because the gravitic compensators kept things at space standard all the time.

I still wanted to be helpful. Joe needed moral support. I suggested that I could stay on and run the detector-calculator for them. Scott was a little huffy about it.

"Thanks just the same, Bowen," he told me. "But I think I'll make out all right."

I could see his point. I wouldn't like anybody horning in and telling me how to run my business, either, even if he did claim to know all about it. Joe sort of chased me out then and I was glad enough to go because Desi was waiting for me, and even a pirate couldn't keep my mind off that. Joe just gave me one word before I left.

"Keep this quiet, Cash," he said, peering out from under his bushy eyebrows.

"Oh, sure, Joe," I reassured him. "So long, Scott. Sit tight, Sparks."

Desi was waiting for me. One look at her in that white thing she had on was enough to make me forget all about Joe Thornton's troubles. She had another little kiss for my cheek, this time on the other side, and in two seconds I was floating right out of space and time.

But even Desi couldn't keep my thoughts where they belonged. Back at our table after we had eaten and waltzed around the dance floor a couple times, I began to peek at my wrist chronometer. That pirate was pulling closer all the time and I began to get on edge.

Now, looking at your chrono is no way to make time with a babe like Desi. Maybe about the third peek, which I thought was pretty well hid-

den, she let me have it.

"Boring you, Cash?" she drawled.

I knew I was in trouble. Her throaty voice was dripping nectar. "Aw, honey," I lied. "How can you talk like that?"

That didn't fool her for a second. She took my hand in hers, pulled it over to her and slowly unfastened my timepiece. My great-grandfather Wilson had been given that Zigonian chrono, with a special Terrestrial works in it, and it had been handed down through the family ever since then, and I guess it was expected it always would be, because those Zigonians make a chrono to last forever. If it had been anybody else in the Galaxy but Desi, I would have put up a kick.

"Now I'm in hock to you, baby," I grinned. "What do I have to do to get it back?"

Her black lashes screened her purple eyes, and her lips smoothed in the barest smile. "Try anything you like," she suggested, leaning back on the seat. Joe's pirate dissolved from my mind in a whirl of ideas.

I got up slowly and walked around the table, holding out my hand to Desi.

"Too crowded up here for my talents, honey," I said, giving her the smile I save for the kill.

She smiled it right back at me and rippled to her feet. As we floated by the bar I gave the boy the eye, and by the time we reached my

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cabin a bottle of champagne was waiting for us.

It was funny the way we got rid of that wine. We were both in sort of a haze, anyway, especially me. Just how it happened I don't remember, but I must have come a little way out of the fog, because Desi began to tease me.

"Poor Cash," she mouthed softly. She mussed my hair, or what there still is of it. "You look just like a calculator salesman. Do my eyes look like dials?"

That was the last thing in the world she should have said. Maybe it was the wine that did it. Anyway, I suddenly remembered about Joe's pirate. "What time is it, sugar?" I asked her.

She just laughed at me. "Oh, no, not yet!" she gurgled. "You'll have to try harder!"

But I was still thinking about that pirate. "Come on, Desi," I pleaded. "I've got to know."

"Why?"

"Oh, I've just got to. Come on, sugar."

"Nope."

Well, fun's fun, and all that, but I wanted my ticker back. "Look, Desi," I said. "I promised the captain that . . . Uh! . . . Ulp!—" It was the flip-flop again.

Desi saw it on my face. "There," she said, "let that be a lesson to you." When my green look still didn't vanish, her voice took on a little concern. "Still feel funny, Cash? Here, a little wine will fix that."

But I pushed the glass away. "No," I said. "I've had enough of that already. Look, Desi, now I've got to go."

"Don't be silly," she protested. "It's too late now anyway. You know they just cut the drive back in."

That floored me. That positively knocked the props out from under my whole universe. My insides did another flip-flop that had nothing to do with any changes in acceleration.

"What? Again?" Desi said, a little bewildered.

I stood up. "I'm leaving you, baby," I said in a flat, hard tone. "If you leave this cabin before I come back I'll chase so many psychiatrists after you that you'll never have another moment's fun in your whole life. Do you get that? Do you understand? Don't leave!"

She just sat there, dumfounded, her eyes trying to focus on me, suddenly aware she had had too much to drink. I didn't give her a chance to answer. It took me just about two minutes to get forward to the control room.

Pushing my way past Joe's guard, I found Thornton, Scott and Sparks sitting very quietly there. They all looked up when I barged in, of course, but nobody said a word.

"Well," I broke the silence, "he got away with it, eh?"

Joe nodded. He didn't look like he wanted to

talk. I walked over to the detector panel. The pirate had just pulled away, it was apparent, and he wasn't leaving very fast. For some reason it was matching our geodesic acceleration so that our detector could hold onto him.

Scott, the good-looking navigator, was sitting at the keyboard. I waved him out of the seat, and he sulked, looking as if the world was about to come to an end. "Don't take it so hard," I told him. "Let me at that a minute."

If you've never played with a big detector calculator, you may not know just how complicated a thing it is. A machine that will do nineteen kinds of differential and integral calculus, the flash of a gnat's eyes has to be pretty fast. It takes years to learn all they'll do, or all that they know they will do.

I gave this machine the routine. First I added in some figures and ran them out a few times, and then the complement back in and she came out right. Scott was watching me, his lean haunches propped on the chart table. He kept his eyes on what I was doing while I ran out the rest of the tricks I know to make a machine swallow chaw. Everything was O. K.

Then I tried the differentiators. I ran them backward and forward, tried every integral system on the board. She didn't gag or gurgle on any of the queries, so I knew nothing was out of whack there. I hadn't expected to find anything wrong. We build that Multiplex-Polyphase to outlast a hundred ships.

Scott stood up and moved over behind me while I cut in the detector switch. There wasn't any harm in seeing how she handled the data on the pirate. Simple stuff, it's true, two-body corrections, but I was curious.

The first derivative with respect to time was as smooth as glass. Not a hump in it anywhere. I looked at the tape a good five minutes before I admitted it, but that was the fact. The second derivative had a couple of very minor humps in it. Nothing to wonder about. Just the sort of stuff you have to expect in a sensitive differential. Normally I would have let it die right there, but I didn't.

I could hear Scott take a deep breath as I flipped over the third derivative switch. The tape streamed out and I gave it a look. It had a few medium humps in it. Not bad, just about what you'd expect from a third derivative on a machine the size of our pirate, and especially since we were beginning to lose the lines of magnetic field behind us as our geodesic velocities began to manifest microscopic differences. So I ran the same derivative over again. Once more, it had a few medium humps.

I stood up and carried the two pieces of tape to the light over the control board, where Joe was sitting. The two tapes, when superimposed, v

exactly the same! Observational errors and chance factors never repeat like that. I had hold of something hot.

Joe and Sparks had been carrying on a low conversation while I fiddled around, and didn't pay much attention when I quit. Scott had gone back to the chart table and was lighting a cigarette.

"You can really play that thing," he told me.

"Yeah," I said. "But where did it get me?" He was going to give me the business on that crack, but I stalled him off with, "Yeah, yeah, I know."

Thornton rose wearily from his seat and came over to me. "Well?" he growled.

"Joe," I asked him, "do me a favor."

"Not today!" he snapped. He was plenty burned.

"Come on, Joe," I insisted. "Won't take a minute."

"What's the matter with you?" he wanted to know.

So I told him. "Joe," I said, "there's something fishy about this pirate."

That slayed him. That ranked with all the dumb remarks ever made. That was priceless. "You don't say?" he rasped. "You don't say! Christmas! Let me out of here!" He turned his back on me and made for the door, this time with the low-to-the-ground positiveness of a heavy tank.

"Hey, Joe," I tried to cool him down. "Listen, I think I know something." That didn't interest him much. In fact he didn't seem to think I knew anything. He said as much, very bluntly. "Be a pal," I pleaded. "Cut the drive again."

"What?" he screamed at me.

"Yeah," I said, trying to keep control of the situation. "And I wish you'd kill the plates, too."

That tore it. Joe just stood there and swore at me. Not loud, not even excited. Just a nice even pace of absolutely scorching invective. He scoured my antecedents, my prospective descendants, reviled Desi by implication. I let him simmer down.

He finally said something printable. "And so you want me to cut the plates so you can get good and sick and mess up my control room, just to make the whole day perfect! Not to mention giving the passengers the screaming meemies!"

"Come on, Joe," I kidded him, winking hugely. "Just for fun. This once I'll keep my cookies down, all for you."

He seemed to have lost all his starch. "O. K.," he agreed without another word, and went to sit at the control board.

But Scott had something to say. "Say, what goes on here?" he demanded, plenty hot. "What're you trying to do, get that pirate to shell us? He's tagging along and watching every move we make! Are you nuts?"



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I let him have it. "What pirate?" I said.

He looked at me for a good thirty seconds without moving a hair. "I don't get it," he finally said.

"Don't kid me, pal," I told him. "Joe, cut the drive and the plates. Give me just one minute weightless." I reached for a handhold.

Joe never got around it. This guy Scott pulled a needle gun out of his coat and stepped back so he had the drop on all three of us.

"I wouldn't try it, Cap," he said, absolutely as cool as ice.

Joe was completely flabbergasted. Two jolts like he'd had in two hours are enough to finish almost anybody off for the day.

"What's the big idea, Tommy?" he tried weakly, but Scott wasn't talking about that.

"You three are just going to sit tight," he decided for us. "This is where I get off."

I tried a shot in the dark, but maybe not so much in the dark at that. "You can't get away with it, Scott," I told him like a father. "You can't leave Desi behind, pal."

"I'll take her along," he decided.

"But you'll have to get her out of the clink first," I lied with the deadeast pan I could muster.

"What did you say?" he grated in a knifelike monotone.

"I just said you'll have to get her out of the brig, Scott. I caught wise back there and had her locked up before I came up here. The guards won't let you get away with it."

Scott looked at me for a long time, his face a blank mask. Just what he was thinking, I couldn't tell. "I ought to kill you," he told me at last.

"Where'll it get you?" I tried, a little shakily.

He nodded and grinned crookedly. "Yeah, yeah, I know," he laughed bitterly. "O. K., I'll make a deal. Keep Desi out of this and I'll put up the gun."

Through all this Joe had just sat at the board like a wooden Indian, and Sparks had peered wide-eyed and pale from the corner by his sets. Joe could stand it no longer. "What is this about Desi? Who in creation is Desi? For Pete's sake, will somebody tell me what goes on?"

"Just say 'yes' to the man, Joe," I told him soberly. He looked at me as though I were a five-legged calf or something.

"O. K.," he said. "I say 'yes,' whatever that means."

So Scott slowly put up his gun. I didn't want to give him so much as a second to do any thinking, so I took it from him pronto. He stood stupidly, staring at my knees. Sparks came out from his cubby and stared just as uncomprehendingly at Scott.

The navigator finally raised his eyes. "How did you catch wise?" he said, his voice still full

of unbelief. I hated to tell him.

"Desi knew something was going on up here, Scott," I said. "When the drive cut back in she told me it was too late for me to do anything. I was either with you or with her the whole time. How did she know anything was going on unless she knew all along that it was going to happen? I played a hunch for the rest."

That's really all there was to it. Desi had given Scott a red-hot idea and he had played it to the end. As navigator, he had the perfect chance to rig auxiliary circuits around every detector dial on the Multiplex-Polyphase. The whole thing was one big robot-controlled liar. The instruments were rigged to indicate a ship approaching, one that never existed. Even his radio sender was fixed to give out signals of varying field strength. Oh, the details were worked out almost perfectly.

But the whole thing was based on the premise that we'd never cut the compensator plates. Cutting them would have scrambled his whole phony data set-up. Since we knew he had never ferried the swag to another ship, we searched him and found the secret documents he had been after still on his person. That made everything jake.

Everything, that is, except Desi. I gave Joe the gun and went down to look her up. She was still in my cabin, debating whether to completely kill the bottle or to leave a swallow in it.

"Hi ya, sugar?" I gave her.

She was getting ready to cry when I came in, and that started her off. "Oh, Cash!" she wailed. "What are you going to do to me?"

I gave her a dirty look. "Your pal Scotty is in the jug," I snarled. "In a weak moment, sister, I made a deal to save your neck. But first you hand over what you got on those first two hauls!"

She made a pathetic attempt to give me a blank stare, but she was too pickled for any real acting. "Cut it out," I advised her. "You're at the end of the line, sister."

She believed me.

Scott took the whole rap. We never did get hold of her other two playmates, mostly because Desi coughed up with what she'd gotten from the *Thespis* and *Ali-Bendez*. The stuff had stayed too hot for her to dispose of. The navigator went willingly enough away to take three years of moral rehabilitation, which is about the limit, firmly believing that his golden Desi would be waiting for him when the psychiatrists pronounced him cured.

I'd like to get some even money down on two bets, boys. First, that Desi wouldn't wait three weeks for any man that ever breathed. Second, that there just ain't any cure for what happened to that poor guy, Scott. And, dammit all, to me, too.

THE END.



# IT'S A TOUGH LIFE

By Frank Belknap Long

● But some of the forms of life have developed toughness—and camouflage—to match. Frogs you can walk on without killing 'em—

Illustrated by F. Kramer

About two years ago L. Sprague de Camp startled, delighted and/or seriously disturbed the readers of Astounding Science-Fiction with an article that has haunted the present writer like a misplaced laundry ticket. If there is one thing a science-fiction author prides himself on, it is the

whacky character of his imagination. "Peopling" the Solar System with bizarre and fantastic animals is his prerogative.

He can't be stopped by anything short of a priority ruling from going to town in that respect, and woe to the scrivener who thinks otherwise.

Be he a disinterested scholar and gentleman like Sprague de Camp, or just a run-of-the-mill scrivener with an ax to grind—woe to him!

For two years now I have been brooding over Sprague de Camp's article, which was labeled: "There Ain't No Such." Buttressed by an erudition surpassing anything I can hope to muster, De Camp made the wild life of Mars, Venus and the great outer planets seem utterly prosaic by dishing up a few choice titbits of *sober natural history*.

"Inebriate" would perhaps be a better word for it, for there is nothing sober about Dame Nature when she lets go with cross-eyed planarian worms which can reproduce by simply dragging themselves over muddy river bottoms, and shrimps that look like something out of "The War of the Worlds."

Being a top-flight science-fiction writer himself, De Camp should have known better than to deprive his fellow-scriveners of their bread and beer. If he hadn't tattled, very few people would have suspected that "there are animals on Earth so completely haywire that not even an author of fiction would try to make them believable."

In appending that charitable by-line to Sprague's article, the editor of *Astounding Science-Fiction* was doubtless aware that he was indulging in an understatement. But—well, his desire to spare so brilliant a contributor snubs and reprisals from every science-fiction author in the business was understandable enough.

Fortunately I am bound by no such scruples. After two years of brooding over Sprague's dastardly attempt to cut off his nose to spite his face, I have decided to do something about it.

While I am reluctant to emulate in any way the bloodthirsty little yellow monkeys which are at present swarming all over the Pacific, I have decided to heap coals of fire on Sprague's head by committing hara-kiri on his very doorstep.

There are times when one can profitably take a leaf from the jungle, and Sprague has left me no choice. Earth, as he has pointed out, can show some pretty queer organisms, and facts are facts. And since I am unable to refute his solidly documented claims, my only alternative is to completely cart away a structure which he has nine-tenths toppled, and left a smoking mass of rubble. I am referring, of course, to the science-fictioneer's House of Wonders.

In "There Ain't No Such" Sprague has brilliantly discussed the unbelievably fantastic life histories of a few terrestrial animals. I stress the "few" because nonconformity is so savagely penalized by Dame Nature that only a scattered handful of living creatures have the guts to hew a path which will expose them to ridicule.

But, anyhow, Sprague has laid a great deal of colorful stress on the outlandish shapes and loco-

motive idiosyncrasies of his water skaters, ichneumon flies and snakes. He has emphasized that the wild life of Mars and Venus can't hold a candle to the fauna of Earth in the matter of environmental acrobatics. But when we now utterly discredited science-fictioneers put a bizarre what-izit? on a satellite of Jupiter and call it a sulphur-eating pupapompus, what is the first test we apply to it?

You've guessed it. We ask ourselves is it predominantly a tough customer—can it survive all hazards? If it can make lovely waste motions and break out in a rash of cranes, derricks and projecting lenses like one of Eric Russell's Mechanistrians, so much the better. But what we are primarily interested in is its ability to *stand the gaff*.

Can it be roughed? Can it be pushed around? It's a tough life form that survives because it will eventually be confronted by Second Stage Lensmen, and other formidable engines of destruction.

"Well, now," I can hear you saying. "You don't have to commit hara-kiri. There are certainly no animals on Earth as tough as the ones you science-fictioneers pull out of your belfries, so to speak."

Far-from-gentle reader, that's what *you* think. De Camp may have but cursorily skirted that aspect of his subject—cf. his reference to a mold which lives in concentrated sulphuric acid, and a bug which goes skating in the middle of the Atlantic Ocean—but if you imagine that terrestrial life can't give fictional life lessons in the art of staying healthy at the bottom of a well, you've another guess coming.

Before inserting the dagger and drawing it solemnly from left to right we may as well lay down a ceremonial mat to kneel on. The mat is elongated and cylindrical and a very slippery customer. It belongs to a group of soft-rayed fishes distinguished by the presence of an opening to the air bladder, and the absence of pelvic fins, and is popularly known as an eel.

The common fresh-water eel, *Anguilla*, has really three habitats. Salt water, fresh water, and the top of a stove. I have personally observed a three-foot eel making itself completely at home in the last-named environment.

It is unquestionably inhumane to put a living eel into a kettle of boiling water and I would shrink from it. But one of my Izaak Waltonish friends is more tough-fibred in that respect. He thinks it improves the flavor or something, and when I strayed into the presence of the eel in question it was too late to do anything about it. He was out of the pot, and wriggling about on a red-hot range.

"Five minutes in boiling water," my friend complained, "and he's still thinking about raising a family."

It shouldn't be hard to kill an eel, of course, since we have now explosives much more powerful than trinitrotoluol. But the salt fly *Ephydra* is an animal of another color. The salt fly is as black as pitch, and it lay its eggs in salty marshes, and briny inland estuaries. When the eggs hatch you get grubs which can live for upward of an hour in absolute alcohol.

Formaldehyde is a chill, cadaveric chemical, and I wouldn't want to put my thumb in a ten percent solution, and screw on the cap. But the salt fly grub can swim around in formaldehyde until it breaks out in blisters. Moreover, it doesn't blister easily. It can live for half an hour in a fairly strong solution of carbolic acid, and it can live in vinegar. It could probably survive in sulphuric acid right alongside of De Camp's indestructible mold, but why bring that up?

De Camp had to start with the invertebrates and work up to hop-skip-and-jump snakes in gradual

stages, because a scholarly writer can't afford to be too abrupt. But a man on the mat is less inhibited in that respect.

Self-immolation bestows certain privileges, and like it or not, my next exhibit is going to be a frog. He's called *Trichobatrachus robustus*, and he hails from South Africa. He's the only hairy frog on Earth, but the really astonishing thing about him is that he lives up to his name with a vengeance. So many freakish animals either lack appropriate names, or disgrace the ghost of Linnaeus that it is refreshing to encounter one that doesn't belie its patronymic.

Robustus has to spend hours under water because his natural enemies are no end ferocious. The female burrows in the earth, but the male just flattens himself out at the bottom of a pond, and tries to look like a weed. He doesn't have to try very hard, because he has a fringe of rust-colored hair on his hindlegs and flanks which gives him



an "I grow here" look.

But, of course, protective mimicry is old stuff, and African "bird dropping" insects, Malayan leaf insects, and hickory-tough Yankee walking sticks have nine up on Robustus in that respect. What makes Robustus unique is his ability to stay under water for hours at a stretch.

Ordinary frogs can stay under comfortably regardless of their internal structure. They can store up air in their body tissues, and even breathe through their skins. But when you startle a bull-frog at the edge of a pond, and he gives you an exhibition of fancy diving that would throw an athletic commission into a dither, you don't have to worry about not getting him back.

A little patience will snag him where he sits. Eventually his air supply will grow stale, and he'll pop up out of the mud with his eyes protruding and a "you've got me licked, brother," expression on his mug.

Not so Robustus. He could exhaust the patience of Sisyphus or the Sphinx. He has mastered the art of staying out of sight by taking advantage of the hairs on his hindlimbs and rump.

"Yup," I said "hairs," and if you think there is a catch in it somewhere grab a load of this. The skin of a frog is a sort of flattened-out external lung which pockets oxygen in minute pores from his hindlegs to his snout. Frogs have lungs in their chests, too, of course, but when you're trying to blend with the mud at the bottom of a pond you need plenty of spares.

Robustus has so many spares he doesn't even bother to hold his breath. The hairs which cover him are really elongations of skin, or, if you prefer, epidermal villusities. And while the oxygen-pocketing epidermis of a frog is remarkable enough under ordinary circumstances, when you have hundreds of little points of skin standing out you increase your area of coverage about six thousand percent.

Robustus' skin pockets so much oxygen he doesn't need a bladder-shaped lung in his chest. And what you don't need you seldom get. Instead of a normal lung, Robustus has in his chest a long, thin tube which functions like a bicycle pump. When he thinks that the coast is clear he pumps himself full of air, and up he floats.

He's the shaggiest frog on earth, and the second toughest. The record holder is *Pipa Americana*—another batrachian with a name that fits him like a glove.

"None so vile" perhaps, but I can't resist pointing out that *Pipa Americana* is in all respects a pip. He's wafer-thin, and soggy looking, and he reminds you of something else. The first time you meet him you've strayed into a cow pasture, and had better watch your step. You're circling around him in resentment and disgust when you

perceive that he is repulsively watching you out of eyes like cracks in a coarse clay jug.

He *looks* shapeless and sluggish, but just try stamping on him. You'll hear a *scrunch*, and fifty feet away a frog with the longest legs you've ever seen will be giving you the merry ha-ha from the top of a water barrel.

To add insult to injury, he is bearded like an old New Bedford whaling captain, and can wriggle his "whiskers" at you.

Even more remarkable in some respects are the batrachians which live high up. In the great rain forests of the Amazon you'll run across tree toads *which have never set foot on Earth*. Millions of big and little toads marooned in a sea of foliage two hundred feet from the ground.

It is certainly no joke to have to live amidst interlacing tendrils and screeching parakeets when you're supposed to spend your formative years in a pool, and want to give your bewildered offspring a watery start in life.

No pool for the little ones, you understand? No moist moss to snuggle under when you're a fledgling toad and haven't quite discovered how to forage for yourself. It's a tough predicament to be in, but the brightly hued parent toad surmounts it by collecting rain water in a pouch on his back.

When the eggs hatch, the tadpoles find themselves in a portable swimming pool—scooped out of the old man's hide, so to speak. No wonder Brazilian tree toads become self-reliant later on in life. They've learned how to survive the hard way, in a cubic inch of swimming space.

There are half a dozen equally stalwart "toughies" in the microscopic sphere, but the bear animalcule is perhaps the most amazing in that respect. The bear animalcule lives on moist moss in cool woodland glades. It swims around in a little pool in the moss, but when a spell of dry weather shrivels up its lichenous residence, it *doesn't* coil up and die. It just anhydrates itself, and ceases to reproduce.

Picture, if you can, a shrunken microorganism in a state of suspended animation, a dust fleck on dried mess. Picture months and even years going by like parched pelicans, flapping, limping by, while the sun burns steadily down and the air is filled with dust.

Comes the rain. The bear animalcule begins to swell, and grow moist. It rolls over and feels like a pool again. Before you can say "Coma Berenices" it is swimming about again, flapping its cilia, as happy as a day-old chick.

At this point I am warned by a ceremonial tap on the shoulder that my time is up. Steeling myself, I press De Camp's door bell, give the kris a final, upward twist, and topple forward on the mat.

THE END.



# BOOK REVIEW

**SHELLS AND SHOOTING**, Willy Ley, Modern Age Books, 160 pp., illustrations and diagrams (\$2.00).

I once knew a man who could not afford to get married because he was the sole support of two cameras and five guns.

Later on he sold the cameras to buy another gun. Guns are like that. It is not necessary to be a hunter, not necessary to be in any wise blood-thirsty in order to be a gun crank. The true crank is much more interested in hitting an arbitrary mark on a paper target than in shooting at live things, for he wants to be able to measure his results—it is a mathematical passion. In fact it is not even necessary to shoot guns at all in order to be a gun crank. To be sure it is very pleasant indeed actually to fire guns, to hear them speak and feel the surging recoil. It is a sensuous pleasure, but not a vulgar one. The small-bore enthusiast seems as pleased at the pipsqueak *spat!* of his dainty toy as the gun captain of the sixteen-inch naval gun does at the virile, bass, deck-shivering *Wha—HOOM!* of his dinosaurian giant. The stubby forty-five makes a *CRACK!* that hurts the eardrums; the Infantry's thirty-ought-three goes *Ka-POW!* and rolls the sound around the range; a machine gun chuckles like a demented sewing machine. Fine clean sounds, all of these, and inspiring a pure passion.

But not necessary to the devotee of the art. Mr. Ley does not own a gun. I doubt if he has fired one in years. Like the troubadour of other days it is not needful for him to lay a finger on his lady's hem for him to sing her praises.

Mr. Ley probably knows as much about the history and development of gunnery as any man alive and his treatment of modern weapons is authoritative and meticulously accurate. Portions of this book first appeared in the *United States Naval Institute Proceedings* and in the *Coast Artillery Journal*. These are scientific journals, for the professional, and Mr. Ley's work measures up in every way to their exacting standards—but the entire book is written with the sparkle, the good humor, the wit that regular readers of *Astounding* have long associated with Willy Ley's writings. It is a thoroughly delightful book.

"*Shells and Shooting*" might well be adopted as a first textbook in ordnance for student-professionals. (I am informed that it has already received the official O. K. of Army Ordnance and of the censors as a desirable book for the civilian to read.) About half of the book is concerned with the history of guns and with the ancient masters of the "Black Art"; the other half con-

cerns contemporary weapons, their anatomy and tactical uses. I am not the sort of reviewer who synthesizes the work being reviewed in such a fashion that the reader need not bother to read the book itself. It is my intention to tempt you into laying two dollars on the line in order that Willy may get his cut in royalties.

Therefore, a few *hors d'oeuvres* and I'll call it a day:

Sorry, but the Chinese did not invent guns. See Chapter I.

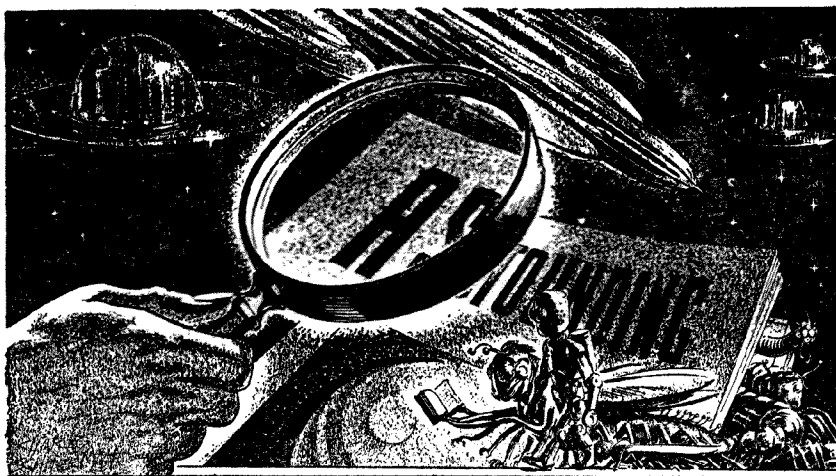
It has frequently been asserted that guns ended the age of the feudal knights because the armor of knights could not stop a musket ball. Sorry—but the guns of the time could not do more than dent armor, whereas a shaft from a longbow could penetrate. Nevertheless guns spelled *kaput* to knights in armor for an entirely different and purely economic reason. See Chapter I.

What is the highest above the surface of the earth ever reached by a man-made object? Stratosphere balloon? Sounding balloon? Rocket? Antiaircraft fire? No, the altitude record is still held by the German gun which shelled Paris in World War I—thirty miles. That may not seem far out in space to followers of the Gray Lensman, but it is hard vacuum out there. Thirty miles is more than twice as high as anything else ever reached.

Who built the biggest gun? And when? Where would you find an account of it? Last question first: In Gibbon's "Decline and Fall of the Roman Empire!" The gun was built by "Urban the Hungarian" for Sultan Mahomet II to be used in the siege of Constantinople. It fired a stone ball *one yard* thick. (Our biggest modern rifles fire a shell sixteen inches thick.)

I have saved the part that amused me the most till the last. Did it ever occur to you to wonder about "the rocket's red glare, the bombs bursting in air"? Does it not sound more like *this* war than the War of 1812? Signal rockets, you say? Sorry—Congreve's bombardment rockets, standard equipment in the British services for many years. The United States army adopted bombardment rockets shortly thereafter and continued to stock them until the Eighties. During the last century most major powers had rocket corps. Yet to the layman who does not read science-fiction, a rocket is a Buck Rogers gadget, impossible and ridiculous. Yet the war rocket, the rocket as a weapon, is much older than the gun. You see—but never mind; you'll be reading about it in "*Shells and Shooting*." —R. A. Heinlein.

# BRASS TACKS



*I guess too many readers are too busy making hardware for Hitler to write arguments to Astounding.*

Dear Mr. Campbell:

The August issue of Astounding was the best in some time. MacDonald's novel, of course, took first place. It has some of the most refreshingly new twists and ideas that have appeared in ages. The issue, as I see it, runs something like this:

"Waldo"—A+

"Impediment"—A

"The Link"—A

"Deadlock"—A

"Bombing Is a Fine Art"—A

"Jackdaw"—B+

"Kilgallen's Lunar Legacy"—B

As you have probably gathered from the above, there was nothing in the issue that I disliked. Cartmill in Astounding seems to have been a successful experiment. Padgett also promises well.

What is happening to Brass Tacks? If it deteriorates any more, it will hit the low that it did only once before in the history of the magazine. Does everyone agree with everyone else? Does no one feel in an argumentative mood? Are those short novels you have been publishing lately the only letters you receive worth publishing? It is not the length or the quality of these letters that I object to. The letters themselves are, for the most part, excellent. (Witness Gibson's effort in the August issue.) However, the fact that you have cut Brass Tacks to the bone makes for a monopoly of the department by a few letters as long as this will probably turn out to be. If you can't give it any more space, why not return to the small type?

The lack of controversy is particularly painful. If it gets much worse, I'll be turning to the contents page first instead of to Brass Tacks. Oh, for the days of the great Van Kampen-Kaletsky war and the pugnacious de Camp. I'd even welcome another fan society for the prevention of something or other.

As for Probability Zero, Ted Carnell has my vote in the August number.

Now for a few questions before I shut up. These have been in my crop for a long time and it will be a relief to get them out.

1. When are you going to give L. M. Jensen a medal or a life's subscription? He is your most consistent supporter. Most of the "old ones from way back" are gone from Brass Tacks, but Jensen lingers on.

2. When are you going to use a heavy paper on the cover again like that on the first large-size issue?

3. When are you going to stop using that horrible dark-green background on the cover? It shows the wear of handling much more than the other covers.

4. Why don't you use the neutral and dignified gray background more often?

I guess that's all.—James W. Thomas, 134 Dexter Street, Valley Falls, Rhode Island.

*Well, Johannesburg is the same distance from Trencó—but it is a bit farther from New York. He'll see this along about April, 1943, I imagine!*

Dear Mr. Campbell:

Most of my letters travel distances not exceeding a few miles, but I now feel the time has come for an exception to be made. And the reason—as

if you didn't know—is Astounding: the omission of quotation marks, I hope, makes the last sentence fraught with meaning. Astounding it certainly is, the way you've steered that old pioneer to its present top-ranking position. I started getting the magazine about two years ago, but as soon as I realized what I'd been missing, I hurriedly made up for lost time by diligently haunting every secondhand bookshop in town until I'd laid my hands on practically every issue since 1936. On occasion I came across a chunk of "The Skylark of Valeron" or "The Legion of Space," but they only served to whet my appetite, and ever since then I've regretted the fact at that time I was just a kid of eleven or so, and my latent intelligence was then so dormant that Astounding would have left me as cold as some of its so-called competitors do now.

I remember seeing a fan's letter once in which he complained that Astounding had become too much of a snob in divorcing its policy so completely from that of the magazines trailing in its wake. There was a great deal of truth in that, but I wouldn't have it otherwise for the world. I have always believed that in a field such as science-fiction, there must be someone to lead the way, even though such a move might lose a number of the "blood-and-thunder" enthusiasts who delight in the thought that they are budding scientists when they read a thriller with "Q-ray hyperspatial ray projectors" substituted for Tommy-guns, and superscientific murderers deluding their victims into an "infrauniversal space-time continuum" instead of "taking them for a ride."

I believe, and it is a very consoling belief, that the great days of Astounding started about the time I began to read it. Now I do not intend to conclude from this that my moral support had anything to do with this change, but I do assert that the loss of all pre-1939 Astoundings would be less regrettable than that of the issues of the last two or three years, which included as they did such memorable stories as "Gray Lensman," "Final Blackout," "Slan," all the Heinlein stories, and last, but not least, "Second Stage Lensmen." Incidentally, I fervently hope and pray that imports from America will continue long enough for me to get the final installments of this serial. It may interest you to know, Mr. Campbell, that the local equivalent of the new twenty-five-cent Astounding is about half a dollar, when it is about a month behind the published date. If I wait, however, for about three months, they come in in great quantities, and cost the equivalent of about fifteen cents. Being the thrifty young man that I am—a university student's income comes to the same in any currency—I thought I'd better wait. It looks like I've waited a bit too long, though. Anyway, here's hoping!

It won't be much use my giving a detailed analysis of my newest issues—my latest is November, 1941—as by the time my letter arrives you'll have forgotten the stories I'm referring to! It would probably be sickening to have to read a letter as full of unadulterated adulation as mine would be. Except for the monstrous illustrations Kramer turns out, and the general sketchiness of most of the art work, I can't find a thing to complain about. The cover, of course, is perfect, ever since the advent of Rogers in February, 1939, and the new-style heading introduced in May, 1940. I pur with pride whenever I look at the trimmed edges, smooth paper, and number of pages, and the actual contents go without saying. The articles are improving consistently, even if I have to take out reference books from the library to understand them!—Sydney Rome, 39 Stiemens Street, Clifton, Johannesburg, South Africa.

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*From what E. E. Smith tells me, "Second Stage Lensmen" was really a stage-setter for the fourth Lensman story in which the real, and hitherto unguessed conflict is revealed. There is one slight hint in the last part of "Second Stage Lensmen."*

Dear Campbell:

I've just finished the August Astounding, and find it tremendously improved over the July one, which was quite the poorest issue, I think, you've ever edited. Nothing in the July issue was really good, with the possible exception of "Tools." "Secret Unattainable" had its points, but can't some author think up a plot for a story laid inside Nazi Germany which isn't based on the scientist with his new invention which he secretly turns against the big shots because they bumped off his favorite relative some years back? About the only thing in the issue I'll remember was the way General Cheroot got in and out of his spaceship.

August is much more like it. "Waldo" is one of the finest stories of the year. Some vulgar people will call it automatically worthless because of the metaphysics. Pay no attention to them: they're the type that beat their old grandmothers. I do think that the introduction of the "maybe the world is so and so just because you and I think it is" business carried a great thing a little too far. Mark Twain's "Mysterious Stranger" handles that so perfectly as to make other attempts appear futile. I believe I'll miss MacDonald more than Heinlein: the former's rambling plots had a freshness and novelty not to be found in Heinlein's work. And I can't think why.

"Jackdaw" was swell. It's the best working out of the theme I've ever seen; probably Rocklynne's best story since the slightly similar "Quietus."

"Impediment" shows that Clement can write. The story seemed much too long to me, though, and leads me to remark that many of these novelettes which you think are better than shorter stories are little more than padded shorts, ballooned by lengthy accounts of an alien race's life and history. Such become tiresome, except when done exceptionally well. There have definitely been too few shorts in Astounding's new size—I'd much prefer an omitted novelette and three shorts in its place.

As to this issue's short stories, Cartmill's disappointed. "Deadlock" was all right, although nothing startling. I expected a better climax to "Kilgallen's Lunar Legacy" than the old business of a hard-drink cache, but the story was entertaining, generally amusing, and worth reading just for the name Higgins.

About the much-discussed "Second Stage Lensmen": I'd say that it wasn't nearly so bad as its violent critics have claimed, but certainly not as good as most of us expected. It was far too long—at least one fourth of its wordage could and should have been cut out. The final pages were utterly ridiculous—beside the marriage, Seaton's wild motorcycle dashes in "The Skylark of Space" read like the height of serious drama. Doc Smith seems to have written himself into a hole: his stories are now entirely too big and cosmic, but his recent attempts at novelettes with more mundane plots suffer from comparison with the big fellows. I don't know what to suggest, except possibly a compromise try on the lines of "Triplanetary."

The art work still stinks to high heaven.

Votes on the Probability Zero things for July: "De Gustibus," "Eat, Drink and Be Wary," and "The Floater" in that order. For August: "Anecdote of the Negative Wugug," "Time Marches On," and "Destiny and Uncle Louie."—Harry Warner, Jr., 303 Bryan Place, Hagerstown, Maryland.

*Boucher's story interested me, also, for a purely technical reason. It's hard enough to write material that flows in straight English. To write, and write well, in that twisted argot—*

Dear Mr. Campbell:

The September Astounding seems to have a slightly different quality, somehow, than that of the last few issues. Some strange new factor that has produced a somewhat changed result. Just what it is, I don't rightly know. Perhaps it's because of the total lack of the crack Asimov-Heinlein-MacDonald-Van Vogt combine, along with some other fairly regular contributors. Another added incentive to many of us, now, for winning the war, is the prospect of seeing those

guys back in active production.

Or mebbe it's due to the first impression given by the new cover illustrator. Doesn't seem likely, though, Rogers, during his long regime as Illustrator Incomparable, Inimitable and Indispensable, set up such a powerful pattern that his successors must needs be influenced into turning out his sort of stuff. They'll be inspired, I hope, into doing work beyond their usual capabilities. The present cover by Timmins is simply Rogers at his poorer sort—which means the drawing is quite good.

Or, which is likeliest of all, the change may have been caused by the stories. For a change, nothing about alien races, other worlds, or space and rocketships—which is certainly unusual, though not exactly unwelcome. And the lead novel itself is one of those time yarns that require quite a bit of common-sense imagination. And the second novel has an unusual amount of heavy science impregnated in it.

"The Barrier," though, is a good tale, packed full of interesting concepts and ideas, concepts that stimulate the mind into conjecture and thought—which, incidentally, is the main reason I read this stuff. Curious to note how semantics, for instance, can cause such changes as Stappers, Slanduch and Seepies, and the use of regular verbs. All darn logical, though; Shakespeare would also be surprised, possibly amused, at some present-day English—particularly the still common use of some of his expressions.

For a while there, I was afraid Boucher had turned out a brushed-up version of "By His Bootstraps," but he managed to turn out a very neat little tale, and an even neater, plausible explanation. As a spinner of detective fiction, Boucher is a good s-f writer. But one point—mebbe I'm still groggy from thinking in terms of time—but what's to prevent a time-traveler of the past—say from Atlantis, or some such—of our present from coming to the present of our present? Or did I miss that point?

Good as it was, "The Barrier" still places second in the issue to "Nerves." Del Rey may have added a bit too much heavy science, the novel may have smacked a little of one glorified operation—but the author's superb writing, interesting plot and development give it enough of an edge to make it a top yarn. Glad del Rey is back in production.

As for the others, "Twonky" and "Pride" are good enough, while "With Flaming Swords" suffers in comparison with "If This Goes On—" Though I read Ley daily in a New York paper, his article, as with the editorial, is fascinating. Tch, no "Probability Zero." And here I was all set to vote for—

Post-war world? Can't very well leave that topic without having a brief fling at it. Now I'd like to see our little ball of dirt with a civilization like that in Wells' "Things to Come," or what is

even more preferable, like the one in MacDonald's "Beyond This Horizon." But I think it will be many a year of bloodshed, strife and toil before mankind gets enough sense knocked into its head to achieve any sort of maturity. And maturity is a prerequisite for those civilizations. In lieu of them, however, this is a vague idea of what I'd like to see as temporary substitute. Suppose that in each country the people got together and decided the kind of government that they'd like to have and they could change it any time they so desired. Naturally, in some such country as India, it would mean that some powerful clique would rule over the illiterate masses and try to keep 'em illiterate. So there would have to be certain requirements for each government—freedom of education particularly—which should include, press, radio, et cetera. Nearly any kind of government works well with the right men in office. And there could be a World League if the people wanted it and thought it more convenient.

But this would be an absurd solution if it were not for a kingpin—in which I agree with Reader Gibson. The old idea of an international police force to enforce these points. Patterned quite a bit after the Lensmen—they would need quite some power to compensate for lack of Lens, but it could be done. They might be a danger in themselves, but entrance via tests, not heredity, might prevent this. The present Commandos should prove a good foundation for this, provided they had to pass an additional stricter mental test, et al.

A rather sketchy picture, of course, not without flaws, and possibly wacky. But, then, it would be rather difficult to run the world any wackier than it is now. Though the Nazis would easily qualify for *that* difficult position.—Bill Stoy, 140-92 Burden Crescent, Jamaica, New York.

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*If the author handles his material skillfully, he does not need to take time out to explain his science—a practice Mr. Earl Smith objects to. It can be worked into the story without interruptions, as the top authors do. It takes immensely more skill, however.*

Dear Mr. Campbell:

I have been reading science-fiction magazines since their infancy in the days before Astounding Stories was even a scientific type of magazine and the only editor of a real science-fiction magazine was Hugo Gernsbach. I've seen all the magazines go through their ups and downs, and there were some pretty high "ups" in the past.

At present, Astounding is unquestionably the best magazine in the science-fiction field. This leadership is due to a variety of factors, but I

think that the principal ones are these:

1. The material in the stories is, in general, better literature from a literary standpoint than that of your competitors.

2. You have had a considerable number of unusual, thought-provoking stories, of which the best were your so-called "Nova" stories.

3. Your magazine is *mostly* filled with imaginative stories with a *fairly plausible scientific background*.

This last point can stand some elaboration. This outburst on my part—which is, incidentally, the first letter I have written to a magazine—was brought on by a letter in your September issue in which a certain Mr. Earl C. Smith complains bitterly at what he calls excessive amounts of detailed scientific explanations. As far as I and all of my friends who read science-fiction are concerned, the detailed technical explanations in the stories have almost always been given by the best authors and have contributed greatly to the interest and plausibility of the stories. Thus I was horrified to read your comment on the letter saying that you are trying to lessen the amount of science in your science-fiction stories. I think that this would be a crime. When an author attempts to provide a logical scientific explanation for some of the things he presents, he is usually more careful about the way he builds his story and makes it seem more real and meaningful. Also, as you remarked in a comment on another letter, "about one third of science-fiction gadgets have already had the 'fiction' taken off!" Certainly, one should be able to obtain a more usable inspiration from a carefully thought-out imaginative "gadget" than from some vague, briefly mentioned, apparatus.

Please don't get the impression that I want only the ultrascientific type of story. The psychological approach is also a fascinating one, and even a few humorous or suitable adventurous stories are O. K., but please don't decrease the amount of science in the true science-fiction stories.

Aside from this opinion, I have no important complaints, and I think that you have everything beautifully managed.—Leonard Powsner, 1500 Edris Drive, Los Angeles, California.

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*Ultraviolet bulbs would work—but as colored lights, not "white" light. And 1° Absolute is —272° C.*

Dear Mr. Campbell:

Here I am again. August issue:

Cover, Hubert Rogers: A. Second best of the year. Yeah—with Rogers in the army, maybe you'll have to use another cover artist. (Wesso?—hopefully.) I have held a grudge against you



because you didn't get him to do some really good covers for "Second Stage Lensmen" instead of the lemons Rogers turned out, but was too ecstatic over the change in size to mention it at the time. November was poorly planned and shaded; December's spaceships were not good and the stars looked pitiful. I still grin with pleasure whenever I think of the magnificent covers Wesso turned out for "Skylark Three" and "Galactic Patrol." Rogers, I must admit, is past his current low spot, and seems at last to be aware of color.

Editorial, John W. Campbell, Jr.: A. Hm-m-m. Incidentally, small type in the letter department might be appreciated, John. How I can digress. But—why wouldn't those ultraviolet bulbs work on that world?

"In Times to Come," ditto: Uh—I guess you need me pretty bad, eh? Well, as soon as I finish this book on plotting stories, I'll try to help you out. The fellow who wrote it stanchly declares he is not a cynic, albeit he does not believe in love, religion or science-fiction.

Probability Zero: First is Speer's "Image of Annihilation." Strange thing—the day before I got my copy of this issue, I happened to be reading Doc Swisher's "What Are Positrons?" myself! Second: "Time Marches On"—Ted Carnell. Third: It's hard to choose. I didn't like either very well. Probably "Destiny and Uncle Louie"—Joe Gilbert. DeCamp's was rotten. Where would he get  $\$100,000 \times 2^{450}$  on a slide rule for a discount? Maybe with a negative exponent—what the dickens am I doing!

As to illustrations: Schneeman's are the only creditable ones in the entire issue. That shading job for Knight's story hints of good things to come. Glad you used the double-page spread again, for "Jackdaw." It looks so much more slick. Schneeman this issue: B+. Orban comes across with the most miserable cartoons of his miserable career, for "Waldo." It is useless to tell you what I think of him. "Impediment"—these one-word titles are getting out of hand, aren't they?—had little better pics. Give him a D+. Kolliker still has nightmares on paper. C—.

This counting bug seems to have hit me, too. By my probably inaccurate count, the three-column pages are wasteful somewhat, or nearly the same. So here's my idea: This issue, you didn't need the three columns until you got to page 127 of "Impediment"; i. e., until you came to the tall ads. So why not make that last novelette two-column type, by which you could probably finish it by page 125, especially if "Brass Tacks" was taken out of the middle of the magazine. O. K., the novelette finishes on page 125. On page 126, you can start the three columns if you want, starting "Brass Tacks" in small type on those last four or five pages, with the ads!

Print a lot more letters, and more of the type that "Science Discussions" used to have, but not omitting "BT" altogether. Letters like Mr. Gibson's are very interesting, and the subject requires debate and discussion. If you don't like the idea, just remember that the great de Camp suggests it, too. So why not try it and see if it doesn't please the readers? O. K., O. K.—I'll shut up.

Here's the ratings for the Lab:

1. "Waldo," Anson MacDonald. (A)

Glad to see you using long novels; can you induce writers to produce them? This one was longer than the one in *Unknown Worlds* this month. Incidentally, the cover was awfully inconsistent with the story. I hope MacDonald will come back and finish some of these stories some day. All of them have been good, except "Sixth Column," but that's only my opinion. I am going to reread it, and I may like it this time.

2. "Jackdaw," Ross Rocklynne. (B)

I can better stomach the "have a cigar, Belgarth" than I could the newspapers, et cetera, in Asimov's recent bi-ology, which was definitely improbable, while this was merely amusing. I have a feeling that either there was a lot in this story I missed, or else Rocklynne intended that I should think that. I will reread it, too.

3. "Impediment," Hal Clement. (C+)

The novelettes seem to hold sway for some reason. Not as enjoyable as "Proof."

4. "Kilgallen's Lunar Legacy," Norman L. Knight. (C)

Rather enjoyable bit of tomfoolery. Probability zero.

5. I am forced to tie "Deadlock," by Lewis Padgett, and "The Link," by Cleve Cartmill, both C—. Not very much to either one, but good reading. Padgett's humor is a bit like MacDonald's. Had you noticed?

If I wanted military articles, I would read *The Infantry Journal* or something. Nevertheless, Ley's explosive articles—"The Magic Bullet," et cetera—are more interesting than Jameson's, but since he is an expert in seemingly everything (!) and since this is *science-fiction* magazine, and since we don't want it turning into a fictionized *Popular Mechanics*, please keep this kind of article out, and lead him elsewhere. (Perhaps *PM* will buy those you won't; play hard-to-get.)

In case this is printed, would you mind telling me what degree Centigrade is 1 Absolute in the heading? Is it —273?

Well, with the thought that it has been just three years since I first picked up a copy of AS-F on a hot July day in 1939, and immediately subscribed and bought all the back issues—my files are now complete, thank you—and that I have yet to be sorry that I did, I leave you with a probable feeling of relief.—Dan King.

*I wonder whether the readers generally want more war stories or none? Comments, please!*

My dear Mr. Campbell:

I guess it is a bit fatuous to write you my impressions of your excellent publication, *Astounding Science-Fiction*, for the magazine that is *current* to me, is, I suppose, a couple of months old to the rest of you readers. That is the fault of these war-time mails, however, and I am still tempted to write you regarding the June, 1942, issue, in spite of this annoying time lag.

You see, I read my way through the magazine, during the few spare leisure hours afforded by my duties in the Royal Navy. I enjoyed it all!

Yes, as I say, I enjoyed it all! There was, in fact, not a story in the whole magazine that didn't have something in it I found of interest, and the whole provided an excellent vehicle for me to escape from the austerities and realisms of present-day life.

But, you know I really expect much more than that from *Astounding Science-Fiction*—

I read almost through the book, enjoying without enthusing, right up unto the last yarn, Robert Abernathy's "Heritage." This one almost made up for the rather lukewarm lusterlessness of the other stories. It was by no means a "classic" of science-fiction, but it did take me out of that "rut," in which the remainder of the magazine left me, and being by one whom I believe to be a "new" author, it left me with a feeling that perhaps here was one to help take Heinlein's place.

I had expected much of Robert Arthur—can Abernathy be a pseudonym of his?—for he has long been quite a favorite of mine, but he disappointed me badly this time. "Time Dredge" was pretty poor! So were "A Nose for News" and "Mudman"—all three just interesting, but without much other merit.

Del Rey's "My Name Is Legion" was merely ordinary and Hubbard's story, disconcertingly commonplace. From these two stanchions of our literature, we have become accustomed to obtain only the very best, and these somewhat inferior stories, both in the one issue of the magazine, were pretty much of a shock. Mind, I read and quite enjoyed both yarns, but they were neither up to the usual Hubbard or del Rey standard.

"Bridle and Saddle" was nice! Yes, a most enjoyable, if not inspired, piece of work, but, a story, nevertheless, whose politics I found myself at loggerheads with on several occasions.

Williams' work is nearly always of high merit, and his story in this issue was much about his fairly high average, but I must say it reminded me much of Rocklynne in style. "Proof" was most enjoyable—a well-planned story!



#### HERE'S HOW—

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My analysis of the magazine is, therefore:

1. "Heritage." 2. "Bridle and Saddle."
  3. "Proof." 4. "On Pain of Death." 5. "My Name Is Legion." 6. "The Slaver." 7. "Time Dredge,"
- "A Nose for News" and "Mudman"—equal.

I have two pet peeves regarding the publication, each of which I am sure many of your readers will agree with. Firstly, there are far too many stories that hinge on the war—I know that this is a trend to be expected, but it certainly is one which is useless as far as the progress of science-fiction as a branch of literature is concerned. Moreover, most of us, I am sure, get a lot of added pleasure in being able to read something that encourages us to forget the sordid facts of everyday life today, rather than being further reminded of same.

The other brickbat is regarding your art work, which is still well below standard. More Schneeman and some Finlay would brighten the art department. Kolliker isn't bad, but your other artists are all too often pretty feeble.

I like the new size very much—quite a slick magazine now, eh? Rogers' covers are pretty often of very high merit.

Anyway, congratulations on the high standard you do still maintain, and all best wishes for the future, from—G. Ken Chapman, 23 Farnley Road, South Norwood, London, S. E. 25, Great Britain.

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*Rubber is scarce—and there never was any in type metal. The only part of the magazine I can shrink or stretch is Brass Tacks. So—it varies.*

Dear Mr. Campbell:

I would like to take Astounding apart section by section. I mean to do it with words.

First, the "Brass Tacks" section: You no doubt appreciate the importance of the readers' section? If so, why is it that this section is not given at least one more page? The customary average of two pages for the reader is certainly no compliment to us fans. Nevertheless, what there is of the department is well conducted. And then again, on second thought, is it? You choose mostly the far more intelligent letters. (Which nearly automatically leaves me out.) And a thing that I like about this department is the comments you make at the beginning of a letter. This is slightly the reverse of what is found in other magazines' readers' departments. Either it is too much of one thing or too little of another. In other magazines the editors sometimes are over-exuberant in answering a fan, while you are the opposite. Now, if you could say something interesting and at the same time make it a bit longer, we would be much more satisfied. Not that the way you handle it now is objectionable. Far from it. But the way you handle it now, you

seem so aloof and cold. Imagination?

I have measured the space Rogers has at his disposal for the cover of Astounding. It is nearly exactly the same space that he used when the magazine was in its smaller size. So I doubt that lack of space is the reason his covers were so much poorer in 1942. They were, you know. The worse one was when he put Flash Gordon—tommy-ray gun and all—on the April cover. Strangely enough, though, I gave his May cover a 4.00, which means an excellent grading. His '41 work had a consistently high grade for quality. When Rogers gets in stride he paints some of the best and most convincing covers in the sf field.

I have developed a private grading system—who hasn't—which I apply to stories that I read and to issues as a whole. I could have told you that your stories attain and maintain the highest quality standards without my system to aid me. Nevertheless, I accept these findings as further proof as to the veracity of this statement. The best that is to be found in Astounding is the serials. They have always been more enjoyable than novels or shorter stories. The best that has appeared in this magazine this year overlapped from '41. I am, of course, referring to "Second Stage Lensman." An imaginatively written serial which E. E. Smith did in a more or less haphazard job—or so said criticizing letters which appeared in this department. Nevertheless, I think that this story is one of the finest that I have read. But I still consider "Slan" as the finest story of sf that I have ever read. Your record of giving us two to three fine serials a year is unbroken by any other sf mag on the market. Now what do you do? Up pops "Beyond This Horizon." Marvel after marvel comes out of the pages of Astounding Science-Fiction. Now I cannot determine which of the two authors has put out the finest story. Smith or MacDonald?

You know, you would be very much annoyed to see how often I disagree with the Analytical Laboratory. For instance, when everyone was raving over Moore's "There Shall Be Darkness," I just said to myself, "I guess you mustn't have been in a receptive mood, or something." That "or something," doesn't tend to be complimentary to Moore.—George V. Fair, 1029 E. Gutierrez Street, Santa Barbara, California.

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*Background for "Overthrow."*

Dear Mr. Campbell:

Here's "Overthrow."

One historic example, which didn't get into the story, might amuse you. The Roman emperors, from Augustus to Claudius, assured the people in turn that they were donning the robes of em-

peror only because of an emergency. As soon as this cleared up, they said, they'd put the reins of government in the hands of the people. Claudius, poor devil, believed in this policy, and look what happened to him.

Anyway, I drew a parallel, in the growth and fall of a series of military dictatorships in the story, and was pleased to see how the philosophy fitted.—Cleve Cartmill.

*E. E. Smith is too busy making things that go "bang" to bang a typewriter much.*

Dear John:

My "first-bounce" reaction is that "Nerves" should have a *Nova* designation. It has that breath-taking suspense and continuity, together with adroit handling, which have been outstanding features of past *Nova* stories. AnLab No. 1; rating 95. (Aside to del Rey: Your characters certainly "hit" the stimulants—in variety.)

Sorry, but that cover is quite a let-down after so much of the incomparable Rogers. The figure in the foreground is excellent, as are the choice of colors, but if you are going to use this artist for your covers, may I suggest that he study the last dozen or so of Rogers' covers? Remember that "machinery" is planned from mechanical drawings and usually has regular, balanced lines. (Rating, cover, ASF Sept. '42: 82.)

Because of its length, I give second place in the Analytical Laboratory standing to "Barrier." Fairly good writing, but some particularly hazy concepts and jumbled ideas. The first speech of Nikobat, the Venusian, gave the same impression as the story as a whole—a "grab-counter" for a lot of unsorted ideas. Rating 82.

Third place to "Twonky," of course. Quite a conception! Keep giving us these "probability-variant" stories, like this and "Deadlock" in the August issue. Rate it 80.

A close fourth is "Pride." 78. Whoa! I've passed up "Flaming Swords." Excuse it. Very good writing—in fact, after looking it over, I'll rate it a tie for second place; rating 82. (Reads a bit like Asimov.) Don't overdo this theme, authors.

On the illustrations, Orban is fair to good, and the others are not too bad. Schneeman's sticks out like a lighthouse. Oh, for some Wesso and Paul! (Issue average, IntPix: 77.)

The editorial is really a footnote to "Nerves." Article, fair. Issue as a whole, about 82. (A slight drop.)

By the way, is there any chance of a Smith novel within the next six months? Or, perhaps, a Stuart novelette?—Lamont M. Jensen, Box 35, Cowley, Wyoming.



## Was Doc Savage Entitled to His Fortune?

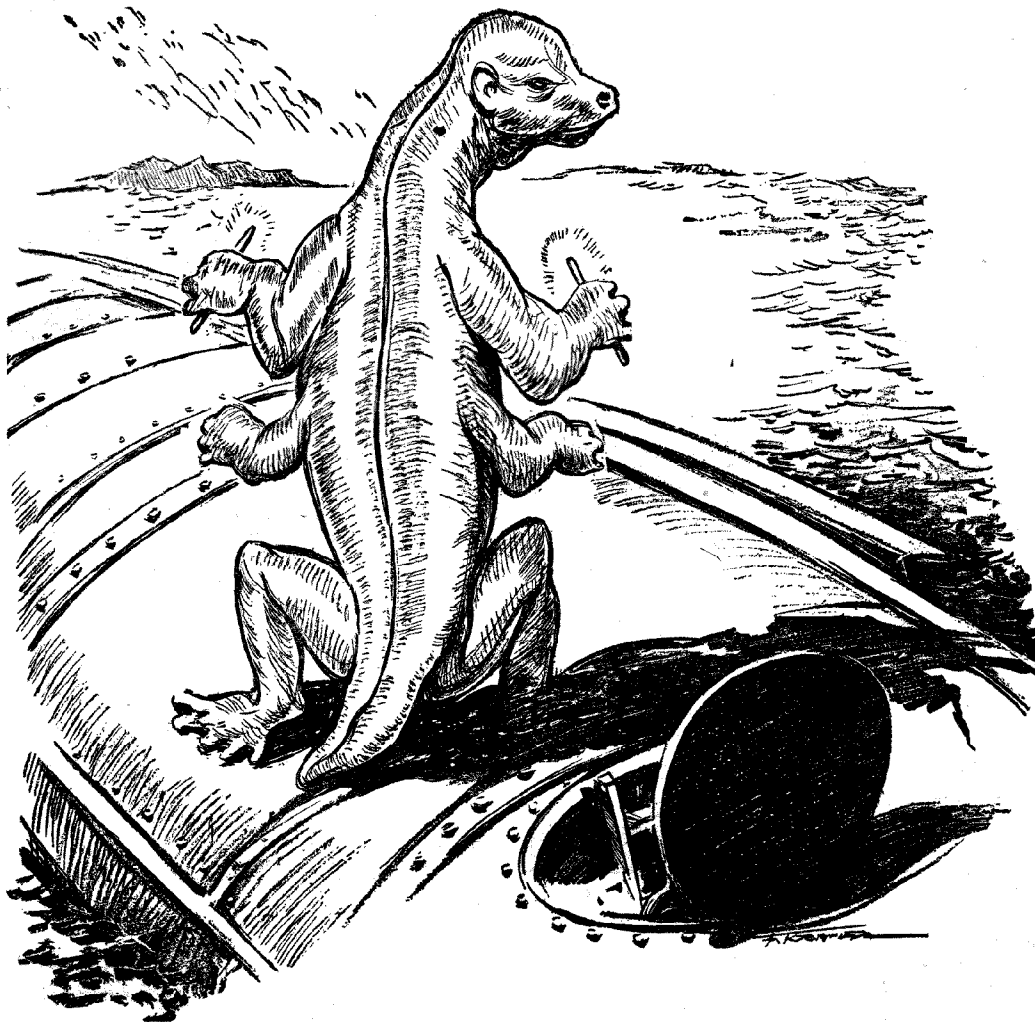
—or had his father's money been gained through crooked means?

Doc got hold of a memory machine that showed his father cheating another man . . . so Doc set out to right the wrong! He was determined to have justice done—even though it meant one of his most closely guarded secrets would have to come out. But things were to take a strange turn before this amazing adventure was ended. . . .

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AT ALL NEWSSTANDS



# NOT ONLY DEAD MEN

By A. E. Van Vogt

● There are times when silence is so utterly vital that lives mean little, times when the fact men are being silent, even, must not be known. For such cases, there are ways which lead to silence other than death.

Illustrated by Kramer

## WHALESHIP FOUND BATTERED DERELICT OFF NORTHERN ALASKA

June 29, 1942—Smashed in every timber, and with no trace of the crew, the whaleship *Albatross* was found today by an American patrol ship in the Bering Straits. Naval authorities are mystified by reports

the deck and sides of the schooner were staved in as by gigantic blows, not caused "by bombs, torpedoes, shellfire or other enemy action," according to the word received. The galley stoves were said to be still warm, and, as there have been no storms in this region for three weeks, no explanation has been forthcoming. The *Albatross* sailed from a West

coast American port early in March, with Captain Frank Wardell and a crew of eighteen, all of whom are missing.

Captain Wardell of the whaleship, *Albatross*, was thinking so darkly of the three long whaleless months just past that he had



started to edge the schooner through the narrows before he saw the submarine lying near the shore in the sheltered waters of that far-northern bay of Alaska.

His mind did a spinning dive into blankness. When he came up for air his reflexes were already working. The engine-room indicator stood at REVERSE FULL SPEED. And his immediate plan was as clear as it was simple.

He parted his lips to shout at the wheelman; then closed them again, made for the wheel, and, as the ship began to go backward, guided her deftly behind the line of shoals and the headland of trees. The anchor went down with a rattle and a splash that echoed strangely on the windless morning.

Silence settled where the man-made sound had been; and there was only the quiet ripple of that remote northern sea, the restless waters lapping gently against the *Albatross*, washing more sullenly over the shoals behind which she lay, and occasionally letting out a roar as a great wave smashed with a white fury at a projecting rock.

Wardell, back on the small bridge, stood very still, letting his mind absorb impressions and—listening.

But no alien sound came to disturb his straining ears, no Diesel engines raging into life, no fainter hum of powerful electric motors. He began to breathe more steadily. He saw that his first mate, Preedy, had slipped softly up beside him.

Preedy said in a low voice.

"I don't think they saw us, sir. There was not a soul in sight. And, besides, they're obviously not fit to go to sea."

"Why not?"

"Didn't you notice, sir—they haven't got a conning tower? It must have been shot away."

Wardell was silent, shocked at himself for not having noticed. The vague admiration that had begun to grow inside him at the cool way in which he handled

the ship deflated a little.

Another thought came into his mind; and he scowled with a dark reluctance at the very idea of revealing a further deficiency in his observation. But he began grudgingly:

"Funny how your mind accepts the presence of things that aren't there." He hesitated; then: "I didn't even notice whether or not their deck gun was damaged."

It was the mate who was silent now. Wardell gave a swift glance at the man's long face, realized that the mate was undergoing a private case of shock and annoyance, and said quickly:

"Mr. Preedy, call the men forward."

Conscious again of superiority, Wardell went down to the deck. With great deliberateness he began examining the antisub gun beside the whale gun. He could hear the men gathering behind him, but he did not turn until feet began to shuffle restlessly.

He looked them over then, glancing from face to rough, tough, leather-beaten face. Fifteen men and a boy, not counting the engineer and his assistant—and every one of them looking revitalized, torn out of the glumness that had been the stock expression around the ship for three months.

Wardell's mind flashed back over the long years some of these men had been with him; he nodded, his heavy face dark with satisfaction, and began:

"Looks like we've got a disabled Jap sub cornered in there, men. Our duty's clear. The navy gave us a three-inch gun and four machine guns before we sailed, and—"

He stopped, frowned at one of the older men. "What's the matter, Kenniston?"

"Begging your pardon, cap'n, that thing in there isn't a sub. I was in the service in '18, and I can tell one at a glance, conning tower bombed off or not.

"Why, that vessel in there has

metal walls like dark scales—didn't you notice? We've got *something* cornered in there, sir, but it isn't a sub."

From where he lay with his little expedition, behind the line of rock ledge, Wardell studied the strange vessel. The long, astoundingly hard walk to reach this vantage point had taken more than an hour. And now that he was here, what about it?

Through his binoculars, the—ship—showed as a streamlined, cigar-shaped, dead metal that lay moveless in the tiny pattern of waves that shimmered atop the waters of the bay. There was no other sign of life. Nevertheless—

Wardell stiffened suddenly with a sharp consciousness of his responsibilities—all these men, six here with him, carrying two of the precious machine guns, and the other men on the schooner.

The alienness of the vessel with its dark, scaly metal walls, its great length—struck him with a sudden chill. Behind him somebody said into the silence of that bleak, rocky landscape:

"If only we had a radio-sending set! What a bomber could do to that target! I—"

Wardell was only dimly aware of the way the man's voice sank queerly out of audibility. He was thinking heavily: Two machine guns against *that*. Or, rather—even the mental admission of greater strength came unwillingly—four machine guns and a three-incher. After all, the weapons back on the *Albatross* had to be included, even though the schooner seemed dangerously far away. He—

His mind went dead slow. With a start he saw that the flat, dark reach of deck below was showing movement: a large metal plate turning, then jerking open as if springs had snapped at it with irresistible strength. Through the hatchway thus created a figure was coming.

A figure—a *beast*. The thing

reared up on horny, gleaming legs, and its scales shone in the late-morning sun. Of its four arms, one was clutching a flat, crystalline structure, a second held a small, blunt object that showed faintly crimson in the dazzling sunbeams. The other two arms were at ease.

The monster stood there under Earth's warm sun, silhouetted against the background of limpid, blue-green sea, stood there arrogantly, its beast head flung back on its short neck with such a pride and confidence that Wardell felt a tingle at the nape of his neck.

"For Heaven's sake," a man whispered hoarsely, "put some bullets in it."

The sound more than the words reached into the region of Wardell's brain that controlled his muscles.

"Shoot!" he rasped. "Frost! Withers!"

*Chat-chat-chat!* The two machine guns yammered into life, wakening a thousand echoes in the virgin silence of the cove.

The figure, which had started striding briskly along the curving deck in the direction away from shore, its webbed feet showing plainly at each step, stopped short, turned—and looked up.

Eyes as green and fiery as a cat's at night blazed at, seemingly straight at, Wardell's face. The captain felt the muscles of his body constrict; his impulse was to jerk back behind the ledge, out of sight, but he couldn't have moved to save his life.

The mind-twisting emotion must have been evoked in every man present. For the machine guns ceased their stammering; and there was unnatural silence.

The yellow-green reptile moved first. It started to run, back toward the hatch. Reaching the opening, it stooped and seemed about to leap down head-first, as if it couldn't get in too fast.

Instead of going down, however, it handed the crystalline object that it had held in one hand to somebody below; then it straightened.

There was a clang as the hatch banged shut—and the reptile stood alone on the deck, cut off from escape.

The scene froze like that for a fraction of a second, a tableau of rigid figures against a framework of quiet sea and dark, almost barren land. The beast stood absolutely still, its head flung back, its blazing eyes fixed on the men behind the ledge.

Wardell had not thought of its posture as a crouching one, but abruptly it straightened visibly and bounced upward and sideways, like a frog leaping, or a diver jackknifing. Water and beast met with a faint splash. When the shimmering veil of agitated water subsided, the beast was gone.

They waited.

"What goes down," Wardell said finally in a voice that had in it the faintest shiver, "must come up. Heaven only knows what it is, but hold your guns ready."

The minutes dragged. The shadow of a breeze that had been titillating the surface of the bay died completely; and the water took on a flat, glassy sheen that was only broken far out near the narrow outlet to the rougher sea beyond.

After ten minutes, Wardell was twisting uneasily, dissatisfied with his position. At the end of twenty minutes he stood up.

"We've got to get back to the ship," he said tensely. "This thing is too big for us."

They were edging along the shore five minutes later when the clamor started: a distant shouting, then a long, sharp rattle of machine-gun fire, then—silence.

It had come from where the schooner lay out of their line of vision behind the bank of trees half a mile across the bay.

Wardell grunted as he ran. It had been hard enough walking—earlier. Now, he was in an agony of jolts and half stumbles. Twice, during the first few minutes, he fell heavily.

The second time he got up very slowly and waited for his panting men to catch up with him. There was no more running because—it struck him with piercing sharpness—what had happened on the ship *had* happened.

Gingerly, Wardell led the way over the rock-strewn shore with its wilderness of chasms. He kept cursing softly under his breath in a sweat of fury with himself for having left the *Albatross*. And there was a special rage at the very idea that he had automatically set his fragile wooden ship against an armored sub.

Even though, as it had turned out, it wasn't a sub.

His brain stalled before the bare contemplation of what it might be.

For a moment he tried, mentally tried, to picture himself here, struggling over the barren shore of this rocky inlet in order to see what a—lizard—had done to his ship. And he couldn't. The picture wouldn't piece together. It was not even remotely woven of the same cloth as all that life of quiet days and evenings that he had spent on the bridges of ships, just sitting, or smoking his pipe, mindlessly contemplating the sea.

Even more dim and unconnectable was the civilization of back-room poker games and loud laughing, bold-eyed women who made up his life during those brief months when he was in harbor that curious, aimless life that he always gave up so willingly when the time came to put to sea again.

Wardell pushed the gray, futile memory from him, said:

"Frost, take Blakeman and McCann and pick up one drum of water. Danny ought to have

them all filled by now. No, keep your machine gun. I want you to stay with the remaining drums till I send some more men. We're going to get that water and then get out of here."

Wardell felt the better for his definite decision. He would head south for the naval base; and then others, better equipped and trained, would tackle the alien ship.

If only his ship was still there, intact—just what he feared he wasn't certain—he was conscious of the queasiest thrill of relief as he topped the final and steepest hill—and there she was. Through his glasses he made out the figures of men on the deck. And the last sodden weight of anxiety in him yielded to the fact that, barring accidents to individuals, everything was all right.

Something had happened, of course. In minutes he would know—

For a time it seemed as if he would never get the story. The men crowded around him as he clambered aboard, more weary than he cared to admit. The babble of voices that raged at him, the blazing excitement of everyone, did not help.

Words came through about a beast "like a man-sized frog" that had come aboard. There was something about the engine room, and incomprehensibility about the engineer and his assistant waking up, and—

Wardell's voice, stung into a bass blare by the confusion, brought an end to the madness. The captain said crisply:

"Mr. Preedy, any damage?"

"None," the mate replied, "though Rutherford and Cressy are still shaky."

The reference to the engineer and his assistant was obscure, but Wardell ignored it. "Mr. Preedy, dispatch six men ashore to help bring the water aboard. Then come to the bridge."

account of what had happened. At the sound of the machine-gun fire from Wardell's party, all the men had crowded to port side of the ship and had stayed there.

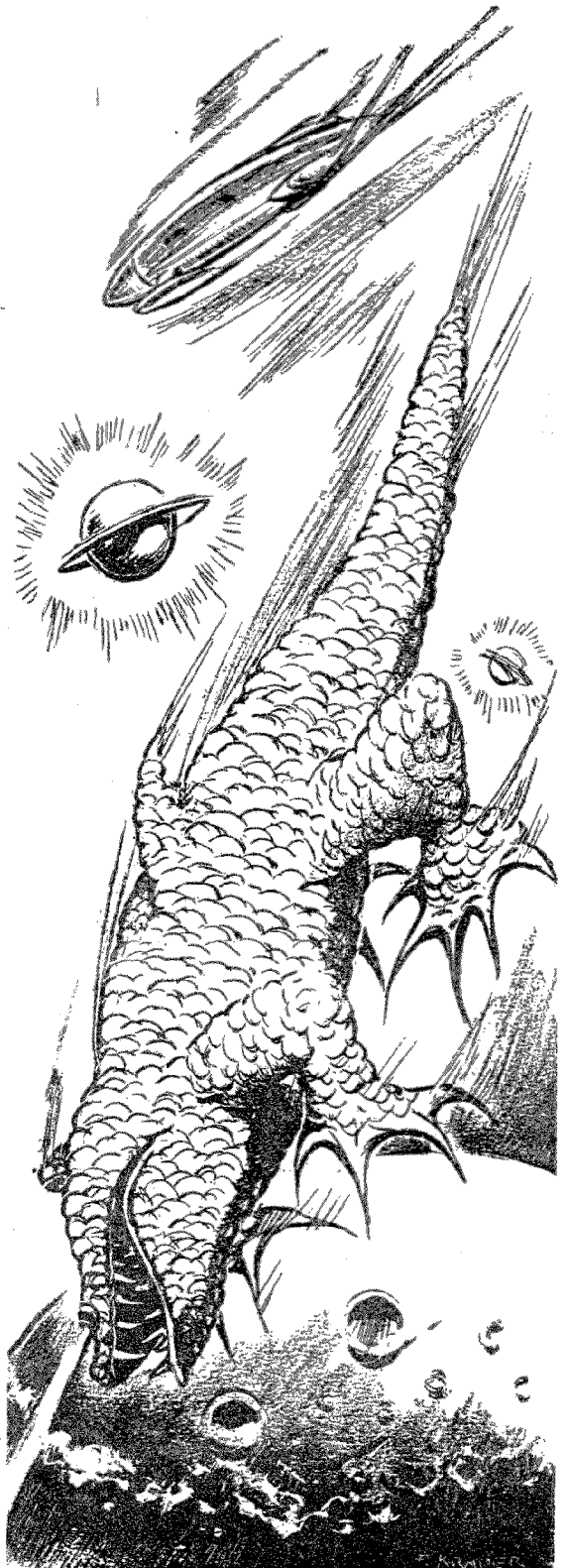
The watery tracks left by the creature showed that it had used the opportunity to climb aboard the starboard side and had gone below. It was first seen standing at the fo'c's'le hatchway, coolly looking over the forward deck where the guns were.

The thing actually started boldly forward under the full weight of nine pairs of eyes, apparently heading straight for the guns; abruptly, however, it turned and made a running dive overboard. Then the machine guns started.

"I don't think we hit him," Preedy confessed.

Wardell was thoughtful. "I'm not sure," he said, "that it's bothered by bullets. It—" He stopped himself. "What the devil am I saying? It runs every time we fire. But go on."

"We went through the ship and that's when we found Rutherford and Cressy. They were out cold and they don't remember a thing. There's no damage, though, engineer says; and,



A few minutes later, Preedy was giving Wardell the story.

That's all."

It was enough, Wardell thought, but he said nothing. He stood for a while, picturing the reality of a green-and-yellow lizard climbing aboard his ship. He shuddered. What could the damned thing have wanted?

The sun was high in the middle heavens to the south when the last drum of water was hoisted aboard, and the whaler began to move.

Up on the bridge, Wardell heaved a sigh of relief as the ship nosed well clear of the white-crested shoals and headed into deep water. He was pushing the engine-room indicator to **FULL SPEED AHEAD** when the thud of the Diesels below became a cough that—ended.

The *Albatross* coasted along from momentum, swishing softly from side to side. In the dimly lighted region that was the engine room, Wardell found Ruth-erford on the floor laboriously trying to light a little pool of oil with a match.

The action was so mad that the captain stopped, stared, and then stood there speechless and intent.

For the oil wouldn't take fire. Four matches joined the burned ends on the floor beside the golden puddle. Then:

"Hell's bells!" said Wardell, "you mean that *thing* put something in our oil that—"

He couldn't go on; and there was no immediate answer. But finally, without looking up, the engineer said thickly:

"Skipper, I've been tryin' ta think. Wha' for would a bunch of lizards be wantin' us ta lay to here?"

Wardell went back on deck without replying. He was conscious of hunger. But he had no illusions about the empty feeling inside him. No craving for food had ever made him feel like that.

Wardell ate, scarcely noticing his food, and came out into the open feeling logy and sleepy. The climb to the bridge took all

his strength and will. He stood for a moment looking out across the narrows that led into the bay.

He made a discovery. In the brief minutes that the Diesels had operated on the untainted oil in the pipes, the *Albatross* had moved to a point where the dark vessel in the distance was now visible across the bows.

Wardell studied the silent alien ship sleepily then gazed along the shore line through his glasses. Finally he turned his attention to the deck in front of him. And nearly jumped out of his skin.

The *thing* was there, calmly bending over the whale gun, its scaly body shining like the wet hide of a big lizard. Water formed in little dark pools at its feet, spread damply to where Gunner Art Zote lay face downward, looking very dead.

If the interloper had been a man, Wardell was sure he could have forced his paralyzed muscles to draw the revolver that hung from his belt. Or even if the thing had been as far away as when he had first seen it.

But he was standing there less than twenty-five feet from it, staring down at that glistening, reptilian monstrosity with its four arms and its scale-armored legs; and the knowledge in the back of his mind that machine-gun bullets hadn't hurt it before, and—

With a cool disregard for possible watching eyes, the reptile began to tug at the harpoon where it protruded from the snout of the whale gun. It gave up after a second and went around to the breech of the gun. It was fumbling there, the crimson thing it held flashing with spasmodic incarnadine brilliance, when a wave of laughter and voices shattered the silence of the afternoon.

The next second the galley door burst open and a dozen men debouched upon the deck. The solid wooden structure that was the entrance to the fo'c's'le hid

the beast from their gaze.

They stood for a moment, their ribald laughter echoing to the skies above that perpetually cold sea. As from a vast distance, Wardell found himself listening to the rough jokes, the rougher cursing; and he was thinking: like children they were. Already, the knowledge that the strangest creatures in all creation had marooned them here on a fuelless ship must seem a dim thing in their minds. Or they wouldn't be standing like mindless fools while—

Wardell stopped the thought, astounded that he had allowed it to distract him for a single second. With a gasp he snatched at his revolver and took aim at the exposed back of the lizard where it was now bending over the strong dark cable that attached the harpoon to the ship.

Curiously, the shot brought a moment of complete silence. The lizard straightened slowly and turned half in annoyance. And then—

Men shouted. The machine gun in the crow's-nest began to yelp with short, excited bursts that missed the deck and the reptile, but made a white foam in the water beyond the ship's bows.

Wardell was conscious of a frantic irritation at the damned fool up there. In the fury of his annoyance he turned his head upward and yelled at the fellow to learn to aim properly. When he looked again at the deck the beast wasn't there.

The sound of a faint splash permeated through a dozen other noises; and, simultaneously, there was a stampede for the rails as the crew peered down into the water. Over their heads, Wardell thought he caught the yellow-green flash in the depths, but the color merged too swiftly, too easily, with the shifting blue-green-gray of the northern sea.

Wardell stood very still; there was a coldness in the region of his heart, an empty sense of un-

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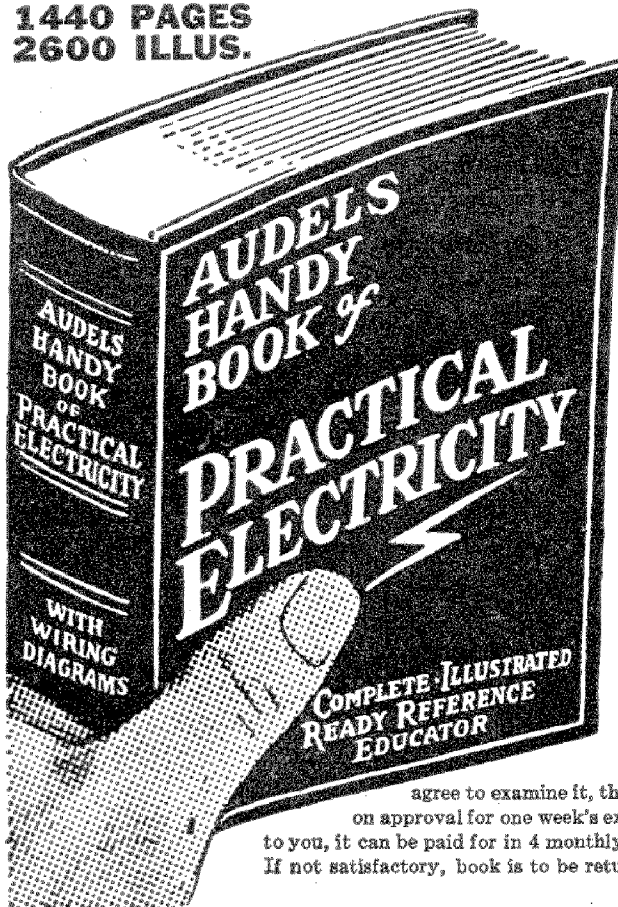
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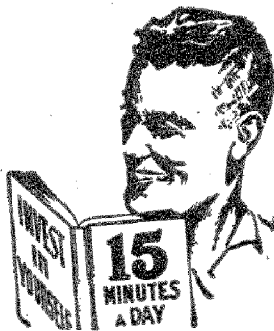
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normal things. His gun hadn't wavered. The bullet couldn't have missed. Yet nothing had happened.

The clammy tightness inside him eased as he saw Art Zote getting shakily up from the deck, not dead, not dead after all. Abruptly, Wardell was trembling in every nerve. Good old Art. It took more than a scoundrelly lizard to kill a man like that.

"Art!" Wardell yelled in a blaze of his tremendous excitement, "Art, turn the three-incher on that sub. Sink the damn thing. We'll teach those skunks to—"

The first shell was too short. It made a pretty spray a hundred yards from that distant metal hull. The second one was too far; it exploded futilely, stirring a hump of grayish rock on the shore into a brief, furious life.

The third smashed squarely on the target. And so did the next ten. It was beautiful shooting, but at the end of it Wardell called down uneasily:

"Better stop. The shells don't seem to be penetrating—I can't see any holes. We'd better save our ammunition for point-blank range, if it comes to that. Besides—"

He fell silent, reluctant to express the thought that had come to his mind, the fact that so far the creatures on that mysterious vessel had done them no harm, and that it was the *Albatross* and its crew that was doing all the shooting. There was, of course, that business of their oil being rendered useless and the curious affair just now, the thing coming aboard for the single purpose of studying the harpoon gun. But, nevertheless—

He and Preedy talked about it in low, baffled tones during the foggy afternoon and the cold evening, decided finally to padlock all the hatches from inside and put a man with a gun in the crow's-nest.

Wardell awakened to the

sound of excited yelling. The sun was just streaking over the horizon when he tumbled out onto the deck, half dressed. He noticed, as he went through the door, that the padlock had been neatly sliced out.

Grim, he joined the little group of men gathered around the guns. It was Art Zote, the gunner, who querulously pointed out the damage:

"Look, cap'n, the dirty beggars have cut our harpoon cable. And they've left us some measly copper wire or something in its place. Look at the junk."

Wardell took the extended wire blankly. The whole affair seemed senseless. He was conscious of the gunner's voice continuing to beat at him:

"And the damn stuff's all over the place, too. There's two other harpoon sets, and each set is braced like a bloomin' mast-head. They bored holes in the deck and ran the wires through, and lashed them to the backbone of the ship. It wouldn't be so bad if the stuff was any good, but that thin wire—hell!"

"Get me a wire cutter," Wardell soothed. "We'll start clearing it away, and—"

Amazingly, it wouldn't cut. He strained with his great strength, but the wire only looked vaguely shiny, and even that might have been a trick of light. Behind him, somebody said in a queer voice:

"I think maybe we got a bargain. But what kind of a whale are they getting us ready for?"

Wardell stood very still, startled by the odd phrasing of the words: *What . . . are they getting us ready for?*

He straightened, cold with decision. "Men," he said resolutely, "get your breakfasts. We're going to get to the bottom of this if it's the last thing we ever do."

The oarlocks creaked; the water whispered gently against the side of the rowboat—and

every minute Wardell liked his position less.

It struck him after a moment that the boat was not heading directly at the vessel; and that their angle of approach was making for a side view of the object he had already noticed at the front of the stranger's metal deck.

He raised his glasses; and then he just sat there too amazed even to exclaim. It was a weapon all right—a *harpoon gun*.

There was no mistaking it. They hadn't even changed the design, the length of the harpoon or— Wait a minute! What about the line?

He could make out a toy-sized roller beside the gun, and there was a coppery gleam coming from it that told a complete story.

"They've given us," he thought, "a cable as good as their own, something that will hold—anything." Once again the chill struck through him, and the words that one of his crew had used: *What kind of whale—*

"Closer!" he said hoarsely.

He was only dimly conscious that this kind of boldness was utterly rash. Careful, he thought, there were too many damn fools in hell already. Fool-hardiness was—

"Closer!" he urged.

At fifty feet, the long, dark hull of the ship, even a part of what was under water, showed plainly; and there wasn't a scratch to indicate where the shells from the three-incher had exploded, not a sign of damage anywhere.

Wardell was parting his lips to speak again, his mind hard on his determination to climb aboard under cover of the point-blank range of the machine gun—when there was a thunder of sound.

It was a cataclysmic sound, like whole series of monstrous guns firing one after the other. The roar echoed hugely from the barren hills and spat backward and forward across the

natural hollow made by the almost completely land-locked bay.

The long, torpedo-shaped ship began to move. Faster, faster—it made a great half circle, a wave of fiery flashes pouring into the water from its rear; and then, having avoided the rowboat completely, headed for the narrows that led to the open sea.

Suddenly, a shell splashed beside it; then another and a third; Wardell could see the muzzle flame of the three-incher on the distant deck of the *Albatross*. There was no doubt that Art Zote and Preedy thought the hour of crisis was at hand.

But the stranger heeded not. Straight for the narrows it thundered, along the gantlet made by the shallows, and then out into the deep water. It rumbled a full mile past the schooner, and then the fiery explosions ceased. The skies emptied of the rolling roar on roar of sound. The ship coasted on momentum, then stopped.

And lay there, silent, lifeless as before, a dark shape protruding out of the restless waters. Somewhere along its course, Art Zote had had the sense to stop his useless firing.

In the silence, Wardell could hear the heavy breathing of the men laboring at the oars. The rowboat shuddered at each thrust, and kept twisting as the still-turbulent waters of the bay churned against its sides—

Back on the whaler, Wardell called Preedy into his cabin. He poured out two stiff drinks, swallowed his own portion with a single, huge gulp, and said:

"My plan is this: We'll fit up the small boat with grub and water, and send three men down the coast for help. It's obvious we

can't go on playing this game of hide and seek without even knowing what the game is about. It shouldn't take three good men more than a week to get to, say, the police station on the Tip, maybe sooner. What do you think?"

What Preedy thought was lost in the clattering boots. The door burst open. The man who unceremoniously pushed into the room, held up two dark objects, and yelled:

"Look, cap'n, what one of them beasts just threw on board: a flat, metal plate and a bag of something. He got away before we even saw him."

It was the metal board that snatched Wardell's attention. Because it seemed to have no purpose. It was half an inch thick by ten inches long by eight wide. It was a silvery, metallic color on one side and black on the other.

That was all. He saw then that Preedy had picked up the bag and opened it. The mate gasped:

"Skipper, look! There's a photograph in here of the engine room, with a pointer point-

ing at a fuel tank—and some gray powder. *It must be to fix up the oil.*"

Wardell lowered the metal plate, started to grab for the bag. And stopped himself with a jerk as an abnormalness about the—black—of the metal board struck him with all the force of a blow.

It was—three-dimensional. It started at an incredible depth inside the plate, and reached to his eyes. Curious, needle-sharp, intensely bright points of light peered out of the velvety, dead blackness.

As Wardell stared at it—it changed. Something floated onto the upper edge, came nearer, and showed itself against the blackness as a tiny animal.

Wardell thought: "A photograph, by Heaven, a moving photograph of some kind."

The thought shredded. A photograph of *what*?

The animal looked tiny, but it was the damndest horror his eyes had ever gazed on, a monstrous, many-legged, long-bodied, long-snouted, hideous miniature, a very caricature of abnormal life, a mad creation of an insane imagination.

Wardell jumped—for the

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thing grew huge. It filled half that fantastic plate, and still it looked as if the picture was being taken from distance.

"What is it?" he heard Preedy gasp over his shoulder.

Wardell did not answer—for the story was unfolding before their eyes:

The fight in space had begun in the only way a devil-Blal was ever contacted: unexpectedly. Violent energies flashed; the inertialess police ship spun desperately as the automatics flared with incandescent destruction—too late.

The monster showed high on the forward visiplat, a thin, orange radiance breaking out from its thick head. Commander Ral Dorno groaned as he saw that orange radiance hold off the white fire of the patrol vessel—just long enough to ruin the ship.

"Space!" he yelled, "we didn't get his Sensitives in time. We didn't—"

The small ship shuddered from stem to stern. Lights blinked and went out; the communicator huzzaed with alien noise, then went dead. The atomic motors stuttered from their soundless, potent jiving to a hoarse, throbby ratchetting. And stopped.

The spaceship began to fall.

Somewhere behind Dorno, a voice—Senna's—yelled in relief: "Its Sensitives are turning black. We did get it. It's falling, too."

Dorno made no reply. Four scaly arms held out in front of him, he fumbled his way from the useless visiplat, and peered through the nearest porthole grimly.

It was hard to see against the strong light of the sun of this planetary system, but finally he made out the hundred-foot-long, bullet-shaped monstrosity. The vicious ten-foot snout of the thing was opening and closing like the steel traps of a steam shovel. The armored legs pawed and clawed at the empty space;

the long, heavy body writhed in a stupendous working of muscles.

Dorno grew aware of somebody slipping up beside him. Without turning, he said tautly:

"We've knocked out its Sensitives, all right. But it's still alive. The pressure of the atmosphere of that planet below will slow it down sufficiently, so that the fall will only stun it. We've got to try to use our rockets, so that we don't land within five hundred *negs* of that thing. We'll need at least a hundred *lan*-periods for repair, and—"

"Commander . . . what is it?"

The words were almost a gasp, so faint they were. Dorno recognized the whisper as coming from the novitiate, Carliss, his ship wife.

It was still a little strange to him, having a wife other than Yarosan. And it took a moment in this crisis to realize that that veteran of many voyages was not with him. But Yarosan had exercised the privilege of patrol women.

"I'm getting to the age where I want some children," she had said, "and as, legally, only one of them can be yours, I want you, Ral, to find yourself a pretty trainee and marry her for two voyages—"

Dorno turned slowly, vaguely irritated at the idea that there was somebody aboard who didn't automatically know everything. He said curtly:

"It's a devil-Blal, a wild beast with an I. Q. of ten that haunts these outer, unexplored systems, where it hasn't yet been exterminated. It's abnormally ferocious; it has in its head what is called a sensitive area, where it organically manufactures enormous energies.

"The natural purpose of those energies is to provide it with a means of transportation. Unfortunately, when that thing is on the move, any machine in the vicinity that operates on forces

below the molecular level are saturated with that—organic—force. It's a long, slow job draining it off, but it has to be done before a single atomic or electronic machine will function again.

"Our automatics managed to destroy the Blal's Sensitives at the same time as it got us. We have now to destroy its body, but we can't do that till we get our energy weapons into operation again. Everything clear?"

Beside him, Carliss, the female Sahfid, nodded hesitantly. She said finally:

"Suppose it lives on the planet below? And there are others there? What then?"

Dorno sighed. "My dear," he said, "there is a regulation that every crew member should familiarize himself or herself with data about any system which their ship happens to be approaching, passing or—"

"But we only saw this sun half a *lan* ago."

"It's been registering on the multiboard for three *lans*—but never mind that. The planet below is the only one in this system that is inhabited. Its land area being one twentieth or more of the whole, it was colonized by the warm-blooded human beings of Wodesk. It is called Earth by its people, and has yet to develop space travel.

"I could give you some astro-geographical technical information, including the fact that the devil-Blal wouldn't willingly go near such a planet because it most violently doesn't like an eight-*der* gravity or the oxygen in the atmosphere. Unfortunately, it will live in spite of this physical and chemical irreconcilability, and that is the enormous, indeed the absolutely mortal danger.

"It has a one-track hate mind. We have destroyed its main organic energy source, but actually its entire nervous system is a reservoir of sensitive forces. In its hunting, it has to project itself through space in pursuit

of meteorites traveling many miles per second; to enable it to keep track of them, it ages ago developed an ability to attune itself to any material body.

"Because of the pain we have caused it, it has been attuned to us from the first energy exchange; therefore, as soon as it lands, it will start for us, no matter how far away we are. We must make sure that it doesn't get to us before we have a disintegrator ready. Otherwise—"

"Surely, it can't damage a metalite spaceship."

"Not only can, but will. Its teeth are not just teeth. They project thin beams of energy that will dissolve any metal, however hard. And, when it's through with us, just imagine the incalculable damage it will do on Earth before the patrol discovers what has happened—all this not counting the fact that it is considered an absolute catastrophe by Galactic psychologists when a planet learns before it should that there is an enormously superior Galactic civilization."

"I know." Carliss nodded vigorously. "The regulation is that if any inhabitant of such a planet so much as glimpses us, we must kill him or her forthwith."

Dorno made a somber sound of agreement, summarized grimly:

"Our problem accordingly is to land far enough from the beast to protect ourselves, destroy it before it can do any harm, and finally make certain that no human being sees us."

He finished: "And now, I suggest that you observe how

Senna uses the rocket tubes to bring us down safely in this emergency landing. He—"

A gas light flickered outside the door of the control room. The Sahfid who came in was bigger even than the powerful Dorno. He carried a globe that burned mistily, and shed a strong white light.

"I have bad news," said Senna. "You will recall we used rocket fuel chasing the Kjev outlaws, and have not yet had the opportunity of replacing it. We shall have to land with a minimum of maneuvering."

"W-what!" Dorno exclaimed, and exchanged a startled glance with the female.

Even after Senna went out, he had nothing to say. There was nothing to say—for here was disaster.

They labored—Dorno and Carliss, Senna and Degel, his wife—with a quiet, relentless fury. After four *lans*, all the drainers were in position; and there was nothing to do but wait drearily while the electronic structures normalized in their agonizingly slow way. Dorno said:

"Some of the smaller motors, and the useless hand weapons and the power tools in the machine shop will be in operation before the devil-Blal arrives. But nothing of value. It will require four day-and-night periods of this planet before the drive motors and the disintegrators are working again—and that makes it rather hopeless."

"I suppose we could fashion some kind of reaction gun, using the remnants of our rocket fuel as a propellant. But they would only enrage the beast."

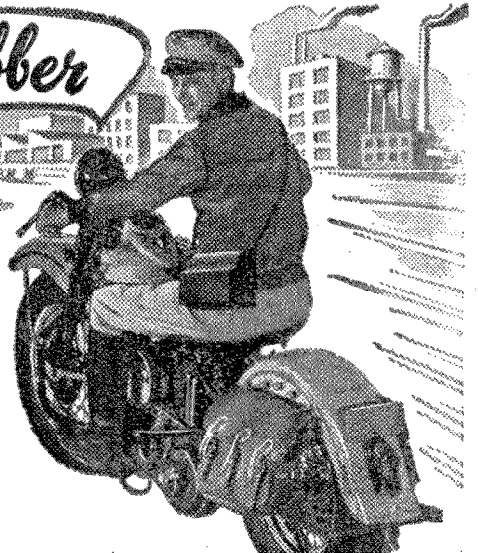
He shrugged. "I'm afraid it's useless. According to our final observations, the monster will have landed about a hundred *negs* north of us, and so it will be here sometime tomorrow. We—"

There was a clang as the molecular alarms went off. A few moments later, they watched the schooner creep through the narrows, then hastily back out again. Dorno's unwinking, lidless eyes watched thoughtfully until the whaler was out of sight.

He did not speak immediately, but spent some time examining

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the automatic photographs, which were entirely chemical in their operation, and therefore unaffected by the catastrophe that had struck the rest of the ship. He said finally, slowly:

"I'm not sure, but I think we're in luck. The enlargers show that that ship has two guns aboard, and one of those guns has a hooked thing protruding from it—that gives me an idea. We must, if necessary, use our remaining rocket fuel to stay near the vessel until I have been aboard and investigated."

"Be careful!" said Carliss anxiously.

"My transparent armor," Dorno told her, "will protect me from all except the most sustained gunfire—"

A warm sun blazed down on the bay, and that made utterly surprising the bitter cold of the water. The icy feel of it in his gills was purest agony—but even the brief examination of the harpoon gun from the fo'c's'le hatchway told him that here was the answer.

"A most remarkable weapon," he told his companions when he returned to the patrol ship. "It will require a stronger explosive to drive it into the Blal, and, of course, better metal in every phase of its construction. I shall have to go back for measurements and later to install the new equipment. But that will be simple. I succeeded in negating their fuel."

He ended: "That will have to be rectified at the proper time. They must be able to maneuver when the Blal arrives."

"But will they fight?" asked Carliss.

Dorno smiled mirthlessly. "My dear," he said, "that is something which we shall not leave to chance. A scopeograph film will tell them the rather appalling story. As for the rest, we shall simply keep their ship between ourselves and the devil-Blal; the beast will sense life-force aboard their vessel and, in

its stupid way, connect them with us. Yes, I can guarantee that they'll fight."

Carliss said: "The Blal might even save us the trouble of having to kill them later."

Dorno looked at her thoughtfully. "Oh, yes," he said, "the regulations! I assure you that we shall carry them out to the letter."

He smiled. "Some day, Carliss, you must read them all. The great ones who prepared them for us to administer made them comprehensive. Very comprehensive."

Wardell's fingers whitened on his binoculars, as he studied the great, bulging back that glistened darkly in the swell half a mile to the north, bearing straight down on the ship. The monster left a gleaming trail in the sea as it swam with enormous power.

In a way, the part of it that was visible looked like nothing else than a large whale. Wardell clutched at the wild hope, and then—

A spume of water sprayed the sea; and his illusion smashed like a bullet-proof jacket before a cannon ball.

Because no whale on God's wide oceans had ever retched water in such a formidable fashion. Wardell had a brief, vivid mental picture of ten-foot jaws convulsively working under the waves, and spreading water like a bellows.

For a moment, he felt violent anger at himself that he should have, even for a second, imagined it was a whale. Rage died, as it struck him that the thought was not really a wasted one. For it was a reminder that he had all his years played a game where fear was not a factor.

Very slowly, very carefully, he straightened. He called in a calm, resonant voice:

"Men, we're in this whether we like it or not. So let's take it in our stride like the damned-

est best whalers in the business—"

All the damage to the *Albatross* was done in the first two minutes after the harpoon belched forth from Art Zote's gun.

At that cruel blow, a nightmare, eyeless head, champing tons of water, reared up; and the attack was a flailing thing of armored legs that stamped as madly at the sea as at the frantically backing schooner.

She was clear at last; and Wardell, clambering shakily out of the ruins of the bridge, grew aware for the first time of the thunderous engines of the lizard's ship, and of a second harpoon sticking in the side of the monster—the harpoon's gleaming coppery tail extending tenuous and taut back to the scale-armored vessel.

Four more harpoons lashed forth, two from each ship; and then they had the thing stretched between them.

For a solid hour, Art Zote pumped the remnants of their shells into a body that writhed with an agonized but unkillable ferocity.

And then, for three long days and nights, they hung on, while a beast that wouldn't die twisted and fought with a senseless and endless fury—

It was the fourth morning.

From the shattered deck of his ship, Wardell watched the scene on the other vessel. Two lizards were setting up a curious, glittering structure, that began to glow with a gray, misty light.

The almost palpable mist poured onto the beast in the sea; and where it struck was—change—that became—nothingness.

There was not a sound now, not a movement, aboard the *Albatross*. Men stood where they were, and stared in a semi-paralyzed fascination, as a one-hundred-ton monster yielded its elements before the transcendental force that was tearing at it.



A long half-hour passed before that hard and terrible body was dissolved—

The glittering disintegrator was withdrawn then, and for a while there was—deadness. A thin fog appeared on the horizon to the north, and blew over the two ships. Wardell waited with his men, tense and cold and—wondering.

"Let's get out of here," somebody said. "I don't trust those scoundrels even after we helped them."

Wardell shrugged helplessly. "What can we do? That bag of chemical powder they threw aboard along with the motion-picture machine, released only one fuel tank, and that the half-empty one. We've used all except a few gallons in maneuvering. We—"

"Damn those scum!" another man moaned. "It's the mysterious way they did it all that I don't like. Why, if they wanted our help, didn't they come and ask us?"

Wardell hadn't realized how great his own tension was. The sailor's words brought a wave of rage.

"Oh, sure," he scathed at the fellow, "I can just picture it. I can just see us rolling out the welcome mat—with a blast from our three-incher.

"And if they ever did get to tell us that they wanted to take the measurements or our harpoon gun, so they could build one of their own, and would we let them fix ours so that it would hold twenty whales at once, and would we please hang around here until that hellish thing arrived— Oh, yes, we would have stayed. Like hell we would!

"But they weren't as big saps as all that. It's the damndest, cold-blooded thing I ever saw pulled off, but we stayed because we had to, and no please or thank you about it. The thing that worries me is the fact that we've never seen their kind be-

fore, or heard of them. That might only prove that dead men have told no tales, but—"

His voice faded, for there was life again on the lizard ship, another structure being set up, smaller, duller in appearance than the first and equipped with odd, gunlike projectors.

Wardell went rigid, then his bellow echoed across the deck:

"That can only be for us. Art, you've still got three shells. Stand by, ready to fire—"

A puff of silver-shining smoke cut off his words, his thoughts, his consciousness—instantaneously.

Dorno's soft, hissing voice made a quiet design of sound against the silence of the space-ship cabin:

"The regulations are designed to protect the moral continuity of civilization, and to prevent a too literal interpretation of basic laws by time-calloused or thoughtless administrators. It is right that low-degree planets should be protected from contact, so vitally right that death is a justifiable measure against those who glimpse the truth, BUT—"

Dorno smiled, said: "When important assistance has been rendered a Galactic citizen or official, no matter what the circumstances, it is morally necessary to the continuity of civilized conduct that other means be taken to prevent the tale from spreading—

"There are precedents, of course," Dorno added quietly. "Accordingly, I have been plotting our new course. It will take us past the distant sun of Wodesk, from whose green and wonderful planets Earth was originally colonized.

"It will not be necessary to keep our guests in a cataleptic state. As soon as they recover from the effects of the silver gas, let them . . . experience the journey."

THE END.

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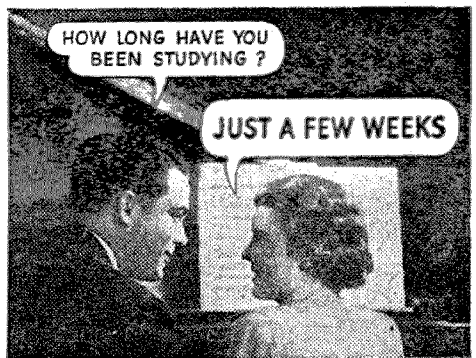
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## AVENUE OF ESCAPE

By Hal Clement

The sergeant swaggered into the dugout, carefully indifferent to the stares of Corporal Snodgrass, Buck Private Kendall, and the captain's orderly. He dropped into a seat at the packing-case table, and the orderly automatically began to deal.

"F'r gosh sakes, sarge, how did you make it?" asked the corporal, picking up his hand. "We thought we'd have to get a new fourth. Ken said you were in a shell hole up front, with a Jap machine gun pecking at you every time you poked your head out. We figgered you'd last till dark, and then they'd crawl out and drop a grenade on you."

The sergeant glared at his cards and then at the orderly. "I have told you children time and again that a clever man—a man, say, intelligent enough to reach the rank of mess sergeant, where all his work is done for him—can find a way out of anything," he remarked, discarding four cards. "If Ken, instead of merely reporting the presence of that machine gun, had gone to the trouble to drop a grenade on it with that trench mortar I developed, I would have been spared the effort of thinking my own way out of trouble; but he was always a thoughtless youngster."

Several hands were played in silence, the men knowing better than to ask questions. As they expected, the sergeant finally unbent.

"It is also like you young squirts to refuse to profit by the ingenuity of yer betters. I suppose it's my duty to explain my methods, in the event of your ever occupying a similar position. As you said, I was in that shell hole, which was the only cover in the neighborhood. My support, consisting of you, had departed rearward under the wing of a handy smoke pot, not leaving room for your superior officer in the cloud. As you know, I have always been opposed to the use of machine guns, and the specimen covering my shelter did nothing to change my opinion. Maybe I can persuade the army to my way of thinking, after this.

"There was only one of the guns in the nest, which was two hundred yards away. Knowing that you were retreating along their line of fire, I thoughtfully refrained from attracting their attention until I was sure you were safe—that was why I didn't follow you just then. When the smoke cleared away so that I could walk without trippin' on things, I came back."

"Huh? Did you have a tank with you?" asked the corporal.

"I did not, son. I have told you many a time machine guns are useless weapons. Consider, please. That gun fired about fifteen hundred shots a minute, with a muzzle velocity of about four thousand feet per second. A little arithmetic, of which even you should be capable, shows that there is a space of one hundred and sixty feet between bullets—enough for any normal man. I walked back."

## EUREKA!

By Malcolm Jameson

Professor Gleason said, "All right," and hung up the phone.

"The Mad Scientist is on the way over," he told his lab director, Max Sunderberg. "Says he has made a great discovery."

"Uh-huh," said Sunderberg, adjusting the flame under a retort. "He often does. Did you ever hear what drove him mad?"

"There are several accounts. Which version do you know?"

"The one about the hole tongs. He always raves when you mention them. They work perfectly, but nobody will finance them. It broke his heart."

Sunderberg stepped to the sink and began washing his hands.

"M. S. got interested in holes when he was just a little shaver. He started collecting them—worm holes first, then woodpecker holes. He invented a

gadget he called the hole extractor. You insert it in the hole, expand it a little, then give it a twist. When you pull it out the hole comes out with it. His attic is full of cases of those holes."

"What on earth does a wall-less hole look like?"

"Nothing. That's what makes M. S. mad. Nobody can see 'em. An unincased hole is just a bunch of air. Well, he improved his device until he hit on a big heavy-duty hole puller. He thought it would be a good idea to buy up used oil wells, lift out the holes and sell 'em."

"How did he propose to handle holes a mile or more long?"

"Oh, he never meant to use 'em again for oil wells. He was going to saw 'em up into short lengths and sell 'em for post holes—"

There was a knock at the door. Gleason opened it. There stood the Mad Scientist with a two-gallon water bottle in one hand. It seemed to be nearly full.

"Here it is," said the M. S. proudly, and promptly proceeded to decant the contents of his bottle into a handy beaker.

"Here is what?"

"You'll see," the M. S. said. He began helping himself to various chemicals about the laboratory. He dropped in a big lump of sulphur. It dissolved instantly. Iron, gold, platinum, rubber, a brickbat—all went the same way. The M. S. kept on. At the end of the hour he had demonstrated that his mixture would dissolve anything put into it.

"I begin to see," said Sunder-berg, with a strange gleam in his eye. "But tell me, will it dissolve glass?"

"Oh, sure," said the M. S. He grabbed up a handful of pipettes and broke them like macaroni. They disappeared in the liquid like sugar does in hot water. He tossed in a quartz crystal, a handful of sand, and a glass cube that was weighting down some papers. They went, too.

"It dissolves anything. It is the universal solvent."

"Marvelous!" gasped the two sane scientists.

## THE SLEEP THAT SLAUGHTERED

By Harry Warner, Jr.

Wilkins and I decided to walk home from the funeral, since it was a sunny, brisk November afternoon.

"He was a very dignified-looking corpse, wasn't he?" Wilkins asked me.

"Yes . . . yes, he was," I replied. "But . . . well, didn't the body look just the least bit—purplish?"

My friend Wilkins gave me a searching stare. "You noticed it, then? If you did, others probably will be talking about it. A shame. The family employed the very best morticians—"

"But why did he have such an unusual complexion? He died from natural causes, I understand."

Wilkins was silent for a moment. Then he said:

"Well, we're good friends, and I think I can trust you not to let this go any further. He did die, I should say, from 'natural' cause. But the circumstances were peculiar, and our late friend was such a fine fellow when alive that those who know the truth don't like to talk about it.

"The late Cackleworthy J. Splunk, as you know, was a great scientist in his retiring way. Just recently he was experimenting on something that might have altered the life of you, me, and everyone else. Alas, the experiments proved fatal to him.

"Splunk, poor fellow, was so confident! His great idea came when he walked in his sleep one night. Unconscious of what he was doing, he somnambulated halfway down the block to a friend's home, and woke up there—he hardly could believe that he had done such a thing.

"That started him to thinking. Most of the brain relaxes while

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we sleep, he knew, but enough of it remains active to make us occasionally dream, and more rarely perform habitual acts like walking and talking in our sleep. Why not, he thought, put that to practical use?

"Splunk had great will power, and wonderful control over his body. First of all, he taught himself to sleep with his eyes open. He told me, just a few days before his death, that fish do it, so why not humans? Ah, a great man we've lost!

"Next, when he had thoroughly mastered that first step, he tried something new. He went to bed, leaving on the light, and propping up a newspaper before him. He went to sleep—eyes open, of course. When he woke, next morning, he remembered every item on the front page of that paper. He'd managed to read it, and understand it, while asleep!

"That was the beginning. He saw the limitless possibilities of his discovery. As you know, our dreams happen in a lightninglike way. Scientists have proved that dreams which seem hours in length to the sleeper, actually pass through his mind in a fraction of a second. Haven't you often dreamed a sequence ended by a pistol shot or landslide and awakened to hear a chair fall or a door slam somewhere in the house?

"Cackleworthy saw his chance to step up man's efficiency, immeasurably. He could do uninteresting, routine tasks not requiring great muscular activity while asleep, and accomplish days of work in a few hours' sleep! And it actually worked!

"He would have announced his discovery next week, had he lived. But three nights ago, it happened. He was asleep, and dreaming, making the time profitable by reading Gibbons' 'Decline and Fall of the Roman Empire.' But he finished it after he had been asleep only ten or fifteen minutes, and didn't want to waste the rest of the night.

He decided to slip down to the corner drugstore for some magazines. He lived in a second-floor apartment, you know, and the building had an automatic elevator. Splunk, still asleep and dreaming, got into the elevator which happened to be vacant at his floor—and started it down to the ground floor; he was never seen again alive."

Wilkins clapped me on the shoulder. "Well, I turn up here. We'll see each other again."

"Wait," I called. "What happened to Splunk? Certainly a twenty-foot ride in an automatic elevator never killed anyone—or did the cage crash?"

"You don't understand?" He looked at me oddly. "Why, I thought you'd realize what happened at once.

"Splunk, you remember, was dreaming. A second of actual time meant hours to him. The elevator wasn't a fast one, and needed several seconds for the trip between floors. Once in motion, the door couldn't be opened until it stopped again. It was late at night, and there were no loud noises to waken him. That was Cackleworthy's trouble."

"But what happened?" I demanded. "Don't tell me he died of boredom, for lack of anything to do during the trip!"

"Of course not," Wilkins said. "You see, the small elevator cage was air-tight. Splunk died of suffocation, before the elevator reached the first floor!"

## THE GREEN SPHERE

By Dennis Tucker

The Green Sphere landed on Earth in the middle of a Mexican desert, on October 27, 2021. As was to be expected, scientists from all round the globe took the first plane they could get, and went to the scene of the landing. They found that what they had heard was true; the Sphere was a brilliant green in color and was composed of very dense matter, being perfectly

round and just over a mile and a quarter in diameter, without sign of a break or rivet on its surface. At night a green fluorescence became discernible, casting a glow rather like that of a mercury lamp, giving everyone present a ghastly pallor.

During the following few days, many and varied were the attempts to break through the wall of the Sphere to the interior, including pneumatic drills with diamond points, oxyacetylene apparatus, and dynamite, but all were to no avail.

It was on the fourth day that first symptoms of the illness became apparent. All the party camping out around the Sphere complained of sickness and dizziness. In brief, their bodies first became the same violent green hue of the Sphere and then seemed to rot away. They died quickly. It was concluded that some emanation originating in the green globe was the direct cause of the disaster, and it soon became apparent that the area of danger was spreading rapidly.

It seemed that the mysterious rays took effect only after an exposure of three days. Humans could endure it with impunity for three days—no more. The spot was now five hundred miles in diameter and still growing with undiminished speed.

Many plans were tried to destroy the thing. Brave souls went into the danger area with trucks of dynamite, which was carefully set out around and under the Sphere. Bombers were sent over, dropping tons of high explosive. Finally, all sorts of radio waves were tried in hopes of counteracting the Sphere's destroying influence. But, miraculously, the green globe emerged unscratched. Still the death spot grew, now having a diameter of sixteen hundred miles, with three thousand deaths accredited to it. Many fled the advancing threat.

It could only have ended in the complete annihilation of the human race, but for the sugges-

tion of the world-renowned physicist, Professor A. Knutt, whose statue now adorns a public place in practically every town on the face of this Earth.

Men were rushed to the Sphere in fast planes and excavating work was rushed with all possible speed. The men who worked the first two days were replaced by a second shift, and so on, each gang working only the two days. Finally, came Earth's great day. The Green Sphere had suddenly shot away from the Earth at an enormous speed and it eventually vanished into the depths of space, whence it came. The menace had gone, leaving a death roll of seven thousand.

In conclusion, and by way of explanation, we quote the professor's radio speech:

"The means of ridding the Earth of the invader from space was at first evasive by its very simplicity. Explosives would not dent the Sphere. We could not destroy it, so the obvious alternative was to remove it from the planet entirely. After a little thought, this was comparatively simple. I had a shaft dug into the ground at a short distance from the Sphere. A tunnel was then cut from the foot of the shaft to a point right under the Sphere. Another shaft upward and we broke surface against the bottom of the Sphere itself. I then had a powerful searchlight installed at the foot of this shaft, and directed it up at the great globe. Then, after fixing a large block of solid helium over the lens of the searchlight, we turned on the current. The result was just as we had planned and expected. The light, on passing through the solid helium, immediately froze solid, giving us, in effect, a projectile traveling at one hundred and eighty-six thousand miles per second. This tremendous force, on hitting the Sphere, was easily able to shift it; to shift it so well, in fact, it was thrown clean out into

space! We then switched off the light and came home."

### A MATTER OF ECLIPSES

By P. Schyler Miller

"Well, sir," said Old Man Mulligan, emptying another tumbler of *spodlak* down his lead-lined gullet, "when you been around for thirty-four thousand years, like I have, you see a lot of mighty peculiar things. Like this business of eclipses—

"Take the time I was on Mars with Pershing—or was it Mac-Arthur? Anyway, I was off somewhere in the drylands by myself with a whole tribe of those runty little natives whoop-in' an' hollerin' after me, an' intendin' to lift my scalp. We'd been shootin' back an' forth at each other for quite a while, an' my water was runnin' a mite low, when this eclipse come on. Now you know well's I do how fast Phobos, the inside moon, moves, an' how quick the temperature drops soon's it gets dark. Matter of fact, Phobos slides in front of the Sun so all-fired fast 'at the eclipse is practically instantaneous, an' the air cools an' condenses so suddenlike that it gives off a crack like a rifle shot. Them drylanders heard this eclipse comin' across the desert like the rattle of a machine gun an' lit out like the whole Patrol was after 'em. Saved my life, it did."

Mulligan reached for a full bottle and filled his glass to the brim. He scratched the top of his naked, bun-shaped skull thoughtfully. "'Tain't only Mars," he observed. "You get some of the damndest eclipses on Jupiter an' Saturn, what with all them different moons.

"I r'member one time I was hidin' out in a portable dome when Black Lem Gulliver an' a bunch of his cutthroats jumped me. We was havin' it hot an' heavy, an' my ammunition was beginnin' to run a little low. There wasn't a Patrol ship inside of a million miles, an' I wouldn't have wanted to see it

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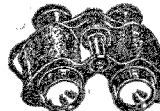
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Watch for the December Astounding one week earlier.

Out November 13, 1942.

any more'n Gulliver did. Anyway, the situation was beginnin' to look sort of serious, with them creepin' up on me behind shields, blastin' away with everythin' from dynamite to heat rays, when along come this eclipse. It's so damn cold on Jupiter that the air freezes in the shadow of the moons, so's you have a column of ice sweepin' across the face of the planet at about thirty thousand miles an hour. Well, sir, that frozen shadow smashed right through Gulliver's gang like a solid tornado an' flattened 'em out like strawberry jam. Only thing saved me from bein' mashed was that two of the moons happened to be in conjunction just then, an' the second shadow come along just in the nick of time, busted right into the first one, an' knocked it out of the way. Didn't miss me by more'n a couple of feet."

He took a long swallow and peered suspiciously at his audience over the top of the glass. "There was another time I was saved by an eclipse," he admitted. "On the Moon it was—only I don't like to tell about it. Anybody that don't have scientific trainin' is apt to think it couldn't happen. But I reckon you men here 't the University Club ought to be broad-minded about things like that. Anyway, you know what diffraction is—

"I don't have to tell you how it is with shadows. Average man looks at a shadow an' he'll tell you it breaks off straight an' sharp, but it doesn't. There's bands of shadow outside the edge, bright an' dark, like stripes, on account of the diffraction monkeyin' up the light waves when they go past somethin'. You take on the Moon, when the Earth gets in front of the Sun an' eclipses it, those stripes of light an' dark are miles wide, on account of the whole thing's on such a big scale.

"Time I'm talking about I was out by myself, prospectin'. Mare Serenitatis or Tycho or some place—don't matter. Well, sir,

I'm pokin' around under a ledge when I get a funny feelin' an' look up. There's a scolloper headin' for me. Now you know well's I do there's no use shootin' at them things—they've got hides like solid rock. All I could do was run, with the scolloper right after me. On the rocks I could get a little bit ahead, but in the dust it could make ten feet to my one. Looked bad for me—an' then I looked up an' saw the Earth beginnin' to creep across the Sun. First thing you know the first strip of shadow come sailin' along, an' right then I knew I had a chance.

"Thing was 'at I could move in the dark, but the scolloper couldn't. Moon animals freeze up in the dark. I'd fumble my way along for a piece, an' then along would come a bright band an' the critter would thaw out an' take after me again. Gain on it in the dark an' lose ground in the light—that's how it was. I figgered if I could keep ahead of it until the main shadow come along, I'd get clean away, but it was too far off an' the bright spaces was too wide. So I picked me a big rock, got my back up against it, an' got ready to fight.

"Well, sir—you know what happened? Like any of us, the Moon animals tell time by the passin' of light an' dark. It's born in 'em. An' with light an' dark stripes passin' over him one right after another like that, damned if that scolloper didn't shrivel up an' drop dead of old age, right there in front of me! Damnedest thing you ever saw! Diffraction was what did it."

He set the empty bottle down reluctantly and picked up his massive oaken staff. "Gotta be goin'," he said. "Next time I'm up this way remind me to tell you about the time I was fightin' for General Joshua, down Jericho way. The time we made the Sun stand still. It ain't exactly an eclipse, but I figger it was a lot like one."

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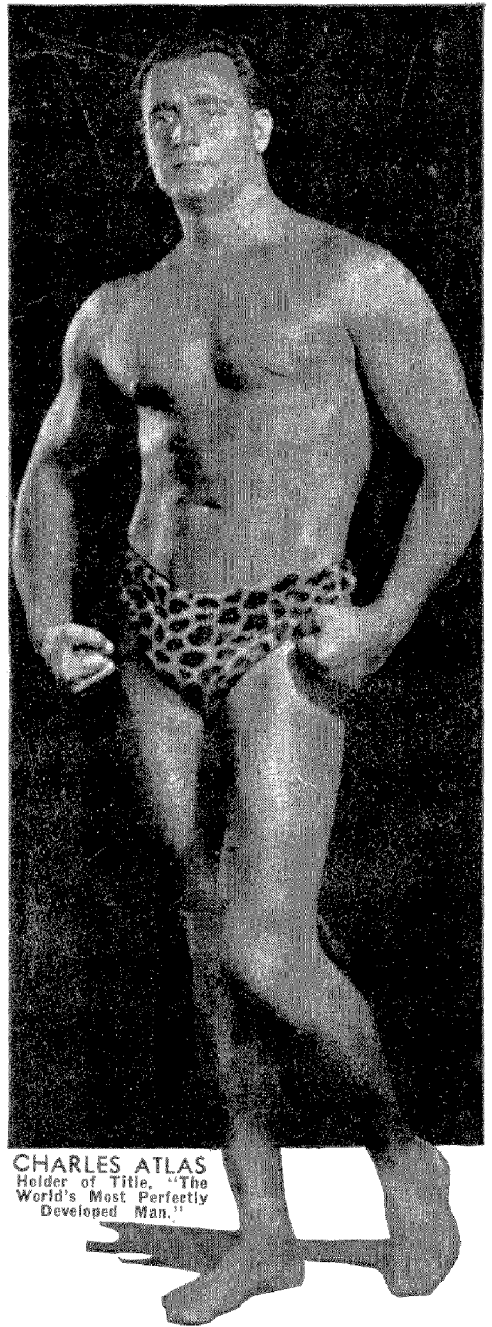
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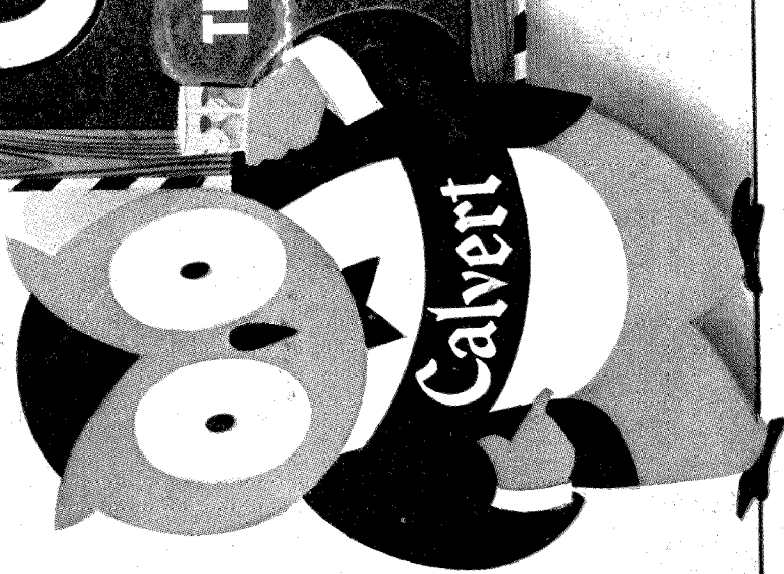
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